THE INFLUENCE OF TEAM MEMBER RESOURCES AND STRUCTURE ON INITIAL EMERGENCY RESPONSE PERFORMANCE OF FIRE FIGHTERS IN MALAYSIA

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THE INFLUENCE OF TEAM MEMBER RESOURCES AND STRUCTURE ON INITIAL EMERGENCY RESPONSE PERFORMANCE OF FIRE FIGHTERS IN MALAYSIA

A Thesis submitted to the College of Business in full fulfillment of the requirements for the degree of Doctor of Philosophy, Universiti Utara Malaysia

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ABSTRACT

This study examines the determinants of initial emergency response performance among emergency response teams. Specifically, the present study examines the direct relationship between team member resources and team structure variables and initial emergency response performance among 126 firefighting teams employed by the Fire and Rescue Department of Malaysia (FRDM). This study also explored the role of cohesiveness as a moderator on the relationship between team structure variables and initial emergency response performance. Self-reported measures of team member resources, team structure, and cohesiveness were obtained from team members, while the initial emergency response performance was derived from the official record on emergency occurrence logged by each fire station.

A number of different analyses were performed to analyze the data collected. Firstly, factor analysis revealed that personality variables loaded into two dimensions, labeled as emotional stability and extraversion, while leadership, roles, norms, and cohesiveness loaded into single dimensions respectively, and were labeled as leadership, roles, norms, and cohesiveness. Multiple regression and hierarchical multiple regressions were used to test the study hypotheses. In detecting interaction effects, significant beta coefficients and post hoc probing by split sample analysis ascertained the acceptance of interaction effects were used. The results provided general support for the hypotheses of the study, although there were some differences on the direction of relationships. Specifically, extraversion, age diversity, and leadership were significantly and positively related to initial

emergency response performance, while weight, cardiovascular endurance, tenure diversity, and norms were significantly and negatively related to initial emergency response performance. Additionally, the results of hierarchical multiple regressions indicated that cohesiveness interacted with age diversity and tenure diversity in predicting the initial emergency response performance. The relationship between team member resources and team structure variables and initial emergency response performance suggests that it would be beneficial to the Fire and Rescue Department of Malaysia (FRDM) to manage team dynamics as a measure to improve initial emergency response performance. Contributions, limitations, and implications are discussed.

ABSTRAK

Kajian ini memberi tumpuan pada faktor yang mempengaruhi prestasi respons awal kecemasan di kalangan pasukan respons kecemasan. Secara specifik ia mengkaji hubungan faktor sumber ahli kumpulan dan faktor struktur kumpulan terhadap prestasi respons awal kecemasan di kalangan 126 pasukan kecemasan yang digajikan oleh Jabatan Bomba dan Penyelamat Malaysia (JBPM). Kajian ini turut meninjau peranan pembolehubah penyederhana, iaitu, perpaduan terhadap hubungan antara faktor struktur kumpulan dan prestasi respons awal kecemasan. Faktor sumber ahli kumpulan, faktor struktur kumpulan, dan perpaduan diukur melalui pengadaran kendiri oleh setiap ahli pasukan manakala prestasi respons awal kecemasan di perolehi daripada buku rekod rasmi catatan kecemasan bagi setiap balai bomba.

Kajian ini mengaplikasikan beberapa teknik analisis data ke atas data yang terkumpul. Pertama sekali, analisis faktor mendapati pengadaran untuk personaliti menghasilkan dua dimensi yang dinamakan kestabilan emosi dan ekstroversi manakala, analisis faktor bagi faktor kepimpinan, peranan, norma, dan perpaduan menghasilkan satu dimensi bagi setiap faktor yang dinamakan sebagai kepimpinan, peranan, norma, dan perpaduan. Analisis regresi berganda dan regresi berganda berperingkat digunakan untuk menguji hipotesis-hipotesis kajian. Bagi ujian interaksi, pekali beta yang signifikan bagi setiap interaksi diperiksa dengan analisis membahagi sampel yang melibatkan graf garisan serta *split regression* digunakan. Secara umum, dapatan kajian memberi sokongan terhadap hipotesis-hipotesis

kajian, walaupun terdapat perbezaan terhadap arah perhubungan. Secara khusus, dimensi-dimensi ekstraversi, diversiti umur, dan kepimpinan mempunyai hubungan positif dan signifikan dengan prestasi respons awal kecemasan manakala dimensi-dimensi berat, ketahanan kardiovascular, diversiti pengalaman kerja, dan norma mempunyai hubungan negatif dan signifikan dengan prestasi respons awal kecemasan. Selain itu, hasil analisis regresi berganda berperingkat, mendapati, perpaduan berinteraksi dengan dimensi diversiti umur dan diversiti pengalaman kerja untuk mempengaruhi prestasi respons awal kecemasan. Penemuan hubungan faktor sumber ahli kumpulan dan faktor struktur kumpulan terhadap prestasi respons awal kecemasan turut membawa manfaat kepada Jabatan Bomba dan Penyelamat Malaysia (JBPM) dalam usaha untuk mengurus dinamik kerja kumpulan sebagai pengukur untuk meningkatkan prestasi respons awal kecemasan. Sumbangan, limitasi, dan implikasi kajian turut dibincangkan.

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CHAPTER ONE

BACKGROUND OF THE RESEARCH

1.1 INTRODUCTION

Emergencies are incidents that occur suddenly, unexpectedly, and life threatening. Incidents come in various forms and sizes such as, in the form of floods, hurricanes, earthquakes, fires, hazardous material, terrorism, and nuclear accidents (Ford & Schmidt, 2000). The last decades saw increasing numbers of incidents occurring around the globe and lately the emergency incidents have increased in number, severity, scope, and complexity. Some of the memorable events include the 1974 chemical plant explosion at Flixborough in the United Kingdom. Soon after that incident in 1976, a toxic chemical release took place in Seveso, Italy. Following closely to this event was the 1979 nuclear power plant accident at Three Mile Island in Pennsylvania, United States of America. In the same year a railway accident involving various dangerous products took place in the suburbs of Toronto in Canada. The 1984 toxic cloud release at Bhopal, India and the 1986 radiation exposure at Chernobyl, near Ukraine at the time part of the Soviet Union, marked some of the worst incidents

in the 1980's. Most recently was the attack on the World Trade Center (WTC) and the Pentagon in 2001.

Severity of an incident varies from one to another. Severity refers to the consequences of an emergency in terms of causalities, destruction, and damage (Perry & Quarantelli, 2004). For instance, the explosion in Flixborough almost completely erased the small rural community killing twenty eight people, injuring fifty three people, and hundreds more suffered minor injuries (Lagadec, 1982; Turner & Pidgeon, 1997). The toxic chemical release in Seveso, Italy was even more severe when it was exposed to approximately 37,000 people. The severity keeps on increasing as more than 240,000 people were affected by the railway accident in Toronto. Meanwhile, the Bhopal tragedy killed more than 10,000 people and over 500,000 people had chronic health effects due to the gas release (Summers, 2005). Finally the attack on the World Trade Center (WTC) and the Pentagon killed nearly 3,000 people and an enormous loss in property.

Scope of an incident refers to the consequences of an emergency in terms of disruption (Perry & Quarantelli, 2004). In certain incidents the impacts are localized. For instance, the Bhopal tragedy affected only the surrounding community in the state of Madhya Pradesh. However the scope was even larger in the Chernobyl incident where the radiation exposure drifted across all of Europe, reaching Greece and Turkey to the south, and across the North Pole to Japan and the west coast of the United States (Lagadec, 1990). Similarly, the 1986 Sandoz warehouse fire in Basel, Switzerland, in which the fire-fighting water which was contaminated with mercury and other chemicals, flowed into the Rhine and affected the

countries where the Rhine runs through (Lagadec, 1990). This makes the mitigating efforts more difficult.

Complexity refers to the characteristics of an emergency incident conditions (Rosenthal, 1998). For instance, the Flixborough chemical plant explosion was caused by the ignition of cyclohexane, a highly flammable product when it came into contact with hydrogen (Lagadec, 1982). It was different in the case of Bhopal, where introduction of water into methyl isocyanate (MIC) started a chain reaction, which resulted in a large toxic cloud release. Meanwhile the Chernobyl incident involved release of radioactivity into the environment due to the reactor's explosion, and it was considered the second major exposure to radiation after the atomic bombs in Hiroshima and Nagasaki, Japan in 1945 (Baverstock & Williams, 2006). In the case of Toronto railway accident, the explosion was a combination of liquid hydrocarbons, petroleum derivates, caustic soda, and chlorine. These chemicals could have decomposed itself into series of extremely toxic products. The recent attack on the World Trade Center (WTC) and the Pentagon involved an airline crash. These were only some of the numerous emergency incidents that required enormous efforts from emergency responders.

Malaysia has also been not spared by continuous and catastrophic incidences. One of the very early incidences that marked the establishment of the need for integrated emergency response in the country was the collapse of Sultan Abdul Halim Ferry Terminal in 1988. The incident killed 32 people and injuring 1,674 others. The overcrowding and the jetty being made of steel bars were found to be the contributing factors to the collapse. Bright

Sparkles firecrackers factory explosion in 1991 killed 22 and injured 103 people. The factory was located 30feet away from a residential area. Fireworks were manufactured and tested in the factory. The incident occurred as a result of new product testing. The fire sparks and smoldering casing fragment flew in many directions; some fell on the chemical, which had been dried, causing a fire. Some fragments flew toward the canteen, which at that time contained finished, and semi finished fireworks. This caused the rockets to fly everywhere, spreading the fire to other places and buildings, causing a series of explosions (Shaluf, Ahmadun, Mustapa, Said, & Sharif, 2002). Subsequent to this incident the Hazardous Material Team was established (Hazmat) (Koshy, Tam, Gill, & Charles, 2006).

The most recent incident in Malaysia was the horrific and devastating tsunami. Tsunami is a series of waves when a body of water, such as an ocean, is rapidly displaced on a massive scale. It is known that earthquakes, mass movements above or below water, volcanic eruptions and other underwater explosions, and large meteorite impacts all have the potential to generate a tsunami. The effect of December 26th 2004 tsunami was completely devastating to lives and habitat. It claimed 68 Malaysian lives and 220,000 people in South and Southeast Asia. It is considered one of the worst natural disasters to date ("Scale of the disaster," 2005).

In sum, the above examples have shown that emergencies can result in great loss of life and property. As such they pose tremendous pressure on emergency response agencies and management of emergency response.

1.2 EMERGENCY RESPONSE

Emergency response needs to be properly managed because it can result in great loss of life and property (Ford & Schmidt, 2000). In an effort to minimize the impact of emergency incidents, emergency response agencies have been established throughout Malaysia. In managing emergency response effectively, resulting from natural or man-made disasters, several factors need to be given serious consideration by emergency management agencies namely resources, system, and emergency response personnel.

1.2.1 Emergency Response Resources

Resources refer to the equipment and supplies used for emergency response purposes. The supplies needed by emergency agencies are equipment for emergency personnel, emergency water, emergency sanitation, materials and tools, monitoring and surveillance, communication, and administrative activities. The resources required depend on the nature of the emergency. Each resource has its own necessity in the emergency response operation. Unavailability of required resources will affect the response effectiveness, which will result in rise in death, injuries, and property damage.

1.2.2 Emergency Response Systems

Besides equipment, there should be a system that enables emergency agencies to have a coordinated effort in responding to an emergency

incident. There are several different systems required in managing emergency response effectively. Firstly, there is a need for developing an emergency operation plan (McEntire & Myers, 2004). The plan will give a general overview of how the entire emergency agencies will respond to an emergency incident. It will outline the respective emergency agency's functions, roles, and responsibility in an emergency. Secondly, the need for a system to command and control the emergency response work such as the Incident Command System (ICS). In an emergency response a cooperative effort amongst various emergency agencies is necessary (Granot, 1997). Typically police, fire and rescue department, and emergency medical services work together, but other support services may be called upon to assist as required by circumstances. This indicates that a substantial number of diverse organizations are likely to be active in managing emergencies. Each agency will be under great pressure to prove themselves to the community. Coordinating the efforts of involved emergency agencies is one of the most troublesome aspects of emergency management (Granot, 1997). The emergency action plan is the umbrella and the incident command system is an element in the plan. Thirdly, there is a need to create a warning system. Warning can provide vital information to the population, allowing people to take measures to protect themselves, and their properties (McEntire & Myers, 2004). There are many types of warning systems that can be used, which include sirens, media emergency alert system, telephone devises, strobe lights, loud speakers, and door-to-door notifications.

The above discussion has focused only on the major systems required in the emergency response phase. The components of resources and

systems are developed for the usage of emergency personnel, the third element that is required in emergency management.

1.2.3 Emergency Response Personnel

Emergency response personnel are the key players in minimizing the impacts of an emergency. First of all, emergency personnel face unusual problems in providing aid to the victims and property. Training is needed to prepare emergency personnel to promptly detect and respond effectively to an emergency incident (Ford & Schmidt, 2000). Secondly, due to the nature of emergency work personnel are often required to work for long hours under difficult and possibly dangerous conditions. This makes them particularly vulnerable to extreme stress, especially after traumatic events (Moran, 1998). Thirdly, the person commanding the emergency incident, known as the incident commander, plays a crucial role in ensuring successful emergency response (Flin & Slaven, 1996). Such individuals are expected to make decision under times of stress and potential personal harm. Because of the significant role, appointing a right person as the incident commander is important to make sure that response activities are undertaken effectively (Flin & Slaven, 1996). The fourth element is the vigorous demands of emergency response work. Successful job performance has been shown to be dependent on the emergency personnel's ability to perform strenuous physical activity (Sothmann et al., 1990). High level of physical fitness will aid emergency personnel to perform in emergency situations (Rhea, Alvar, & Gray, 2004). Therefore, emergency response personnel need to maintain

their physical fitness to reach an optimum performance level. These are just some of the many vital elements of emergency personnel to successful emergency response.

In sum, the three elements of resources, system, and personnel very much determine the success of an emergency response operation. The importance placed in these elements creates a need to examine these factors in relation to effectiveness of emergency response operation.

1.3 EMERGENCY MANAGEMENT

The number, severity, scope, and complexity of an emergency incident are something that is unforeseeable. Nevertheless, emergencies can still be managed if emergency response teams are prepared to respond to them. Emergency response preparedness is a critical element of any emergency management system.

Because of its importance in minimizing the impact of the incident (Tierney, Lindell, & Perry, 2001) great attention has been devoted to emergency management (Alexander, 2005; Granot, 1997). According to Coleman (2005), emergency management comprises three phases. It starts with the preparedness (planning) of the emergency response agencies, followed by the response phase and ends with the recovery phase.

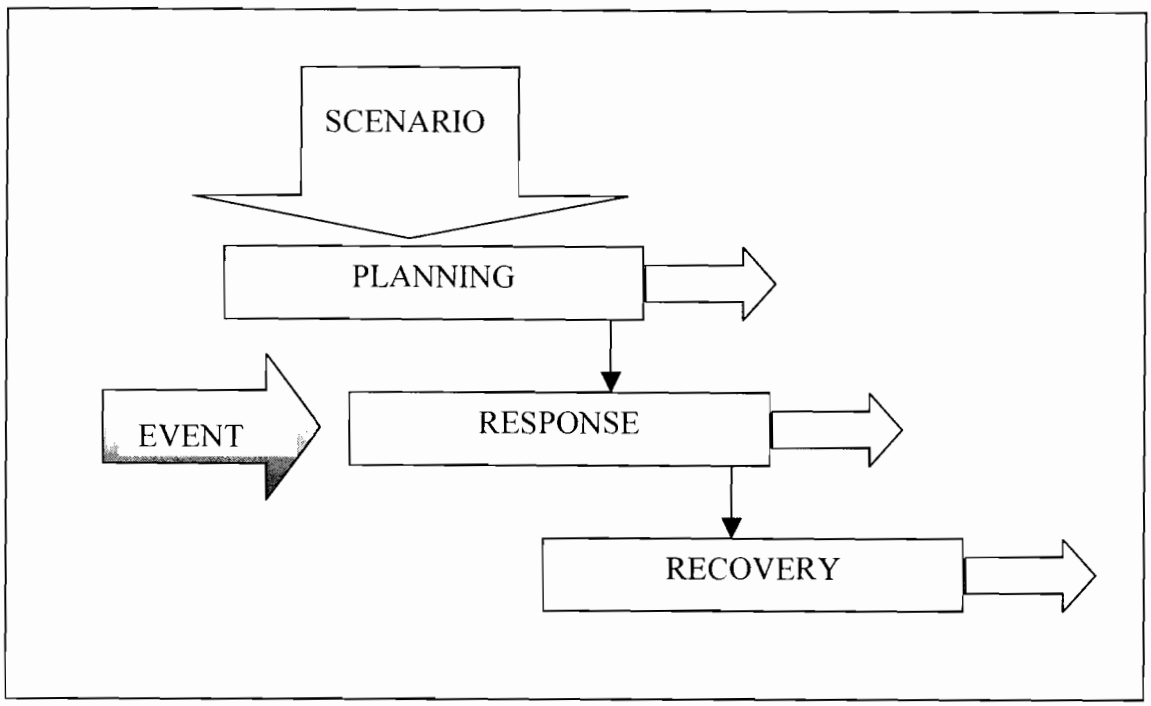

Figure 1.1 Phases of emergency management

Source: (Coleman, 2005)

As shown in Figure 1.1, while each phase in the emergency management is unique, it often overlaps in its execution with each other. According to Coleman (2005), the preparation phase takes the form of plans or procedures designed to save lives and to minimize damage when an emergency occurs. In this phase emergency responders are trained in simulation, and tabletop exercises to prepare for various types of emergencies. In this phase importance is given to the type of simulation, training methodology, and trainer. Several studies have been conducted with focus on the preparation phase. Flin and Slaven (1996) conducted a study to determine the association between personality and emergency command ability among offshore installation managers. It was found that personality characteristics could be used in selecting offshore installation managers in relation to their emergency command responsibilities. In another study,

Peterson and Perry (1999) examined the reported impacts of an emergency exercise among fire fighters. The study revealed that emergency exercises have the ability to change participant's perception of teamwork, response network effectiveness, training adequacy, and job risks. Meanwhile, Morey et al. (2002) and Shapiro et al. (2004) conducted studies to understand performance improvement through training among emergency department caregivers. Both studies indicated training improves team behaviours, reduces medical errors, and improves staff attitudes. In another instance, Rottman, Shoaf, and Dorian (2005) investigated the effects of training on knowledge and competencies among public health professionals. It was found that training improved knowledge and competencies that are linked to emergency preparedness. Markeson, Reilly, and DiMaggio (2005) examined the association between training and comfort level in responding among emergency medical technicians. They found that the more training the participants receive the more comfortable they are in providing emergency response.

The second phase of emergency management is response. This comprises actions taken to save lives and prevent further damage in an emergency situation. The response phase is actually the phase that puts the plans in the preparation phase into action. Response activities include damage assessment, search and rescue, fire fighting, and sheltering of victims. Several studies have examined this phase in detail. According to Al-Ghamdi (2002), variability in response time very much depends on the severity of an emergency incident. Other studies by Al-Ghamdi (2002), and Altintas and Bilir (2001) suggested that response time can provide

performance standards that may be useful in judging the performance of emergency response agencies. In another instance, Pons and Markovchick (2002) investigated the relationship between ambulance response time and cardiac arrest. They found that ambulance response time had no effects on the cardiac arrest patient's survival. In a related study, Pons et al. (2005) examined the association between paramedic response time and patients outcome. Similarly they found that patient's outcome was not associated with paramedic response time.

The final phase of the emergency management is recovery phase, which involves the actions taken to return the community to normal following an emergency. Several studies have also examined this phase. Moran (1998) conducted a study to understand the influence of emergency work experience on stress reaction among fire fighters. An inverted U relationship was found with stress at the highest level among the middle experienced group and lowest among the low and high experience group. In another study, Moran and Colless (1995) examined the reactions and coping style after responding to an emergency incident. Their study revealed that emergency responders reported both positive and negative reactions after responding to an emergency incident.

1.4 PROBLEM STATEMENT

As previously noted the success of emergency management depends on resources, systems, and personnel. Resources are required at the planning, response and recovery phases. Resources need to be identified according to

agencies and the types of emergencies. Availability of resources will further enhance the emergency management activities. Secondly, systems to facilitate the emergency management activities are required. The development of emergency operation plan, incident command system, and warning system helps emergency management activities to be conducted through a more systematic approach. The systems specify the roles, functions, and responsibilities of each responding agency. Finally are the emergency response personnel who serve as the link between resources and the systems. The emergency personnel will be trained to utilize the resources and practice the systems. The training should focus on the types of possible emergencies and the emergency actions to be performed. Later in the actual emergency event, emergency response personnel are expected to put the training into practice. The three factors mentioned above influence the success of an emergency management. The influence of all three factors occurs in all three phases of emergency management. This study however proposes to examine the influence of emergency personnel on emergency response particularly at the response phase.

The investigation into the influence of emergency response personnel on emergency response success is vital as they serve as the first line of defence in emergencies. In the response phase, high speed in responding is required from the emergency response personnel (Flin & Slaven, 1996; Lewis & Payant, 2003; McGue & Barker, 1996). Speed in initial response is vital to the subsequent response activities. Studies have proven that the first few seconds in an emergency is key (Baldwin, 1994), and speed in responding solely depends on the emergency response personnel and not on

the resources or the system. Therefore emergency response personnel are a vital determinant in the response phase. The fast act of the emergency response personnel will contribute in minimizing death, serious injuries, and property damage (Doyle, 1996; Kelly, 1995; Ramachandran, 1999; Tierney et al., 2001).

The emergency response personnel work in high interdependent teams to minimize effectively the impact of an emergency (Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995). Emergency response personnel need to adapt a "system's" work approach with high emphasis given on interdependence among team members (Cameron, 1994; Cosgrave, 1996; Klinoff, 2003). To perform effectively, all team members must understand how their actions affect and are affected by each other, as each one of them has their own expertise to ensure success in various tasks during emergency situations. As such, when emergencies are handled effectively, success is attributed to the whole team and not to any one individual (Senior & Swailes, 2004).

Given the crucial role of emergency response teams to successful emergency response effectiveness, it is surprising that little has been studied to examine emergency response performance. Reviews of the literature suggest that only a handful of studies have focused on emergency response team particularly on the team dynamics, for example, studies by Morey et al. (2002) and Shapiro et al.(2004) looked at the preparation phase in particular to medical emergencies. As such much research work is needed to understand the influence of the team dynamics on emergency response. In reviews by Flin, Slaven and Stewart (1996) and Ford and Schmidt (2000), they emphasized the need for effective teamwork in emergency response.

The present study is well placed to provide empirical evidence on team and emergency response. Therefore this study will contribute to the existing body of knowledge by examining how team member resources and team structure influence emergency response.

Further from a practical standpoint this study is important to responders in Malaysia particularly the Fire and Rescue Department of Malaysia (FRDM) for two reasons. First, the general perception of the public on emergency response service provided by the Fire and Rescue Department of Malaysia (FRDM) is generally unfavourable. The public perceived that the fire fighters are generally late or take a long time to respond to emergencies ("Bomba nafi lambat tiba di tempat kejadian," 2008; "D-G: Firemen leave station 90 seconds after report," 2007; Habibu, 2007; Ismail, 2006; "Use shops to boost service, cops told," 2008; Yoon, 2007). Thus, it is useful to undertake an empirical study to investigate not only how well fire fighters respond in a team situations but also entails how well they perform in responding to emergency situations. The findings of this study may then dispel or reinforce the negative perception of the general public.

Second, in the Malaysian context, very few research have been undertaken to understand emergency management. For example, Aini, Fakhru'l-Razi, Daud, Ibrahim, and Tangavelu (2001) conducted a study among managers and drivers of hazardous material transporters to assess the management system of emergency preparedness and response plan for hazardous material transportation. Indeed there have been many writings done on emergency management, but these are generally reviews of literatures on disasters in Malaysia (e.g. Shaluf & Ahmadun, 2006a, 2006b;

Shaluf et al., 2002). As such, more empirical and scientific studies are needed to understand emergency response performance in Malaysia. Therefore, the present study will examine the influence of team member resources and team structure of the fire fighting teams on the initial emergency response performance as they are recognized to be one of the key emergency responders in Malaysia (National Security Division Prime Minister's Department, 2003).

The present study is conducted on the premise of field theory (Lewin, 1951), which postulates that team member and team member's environment have to be considered as one constellation of interdependent factors to predict and understand team performance. Consistent with this, the study has utilized the group behavior model proposed by Robbins (1993), substantially based on the previous scholars' work (e.g. Bushe & Johnson, 1989; Goodman, Ravlin, & Schminke, 1987; Hackman, 1987), which postulates that team itself has a distinct set of resources determined by its membership and it also has an internal structure that defines member roles and norms that determine team performance. In addition, the present study proposes that cohesiveness acts as a moderating variable on the relationship between team structure variables and team performance, which is in line with the argument that team structure is affected by group influences or interaction in the pursuit of achieving team goals (Bowers, Weaver, & Morgan, 1996; Lewin, 1951). The initial Robbins's (1993) group behavior model proposes that the effects of team member resources and team structure would be moderated by the type of task. However, in the present study, because fire fighting team members have similar types of task during

initial emergency response, the moderating influence of the type of task is therefore irrelevant instead the present study hypothesized that cohesiveness moderates the relationship between team structure variables and initial emergency response and as such the introduction of cohesiveness as a moderator is one of the main contributions of this study. The details of the possible moderator, group behavior model and its theoretical justification will be detailed in Chapter 4 and Chapter 5 respectively.

1.5 RESEARCH QUESTIONS

Based on the discussion stated above on the need to study emergency response performance, four research questions arise for this study:

a. How fast is the initial emergency response among fire fighting teams during emergencies in Malaysia?
b. Do team member resource factors such as ability and personality influence initial emergency response performance of fire fighting teams?
c. Do team structure factors such as team demography, leadership, role, and norm influences initial emergency response performance of fire fighting teams?
d. Does cohesiveness among team members moderate the relationship between team structure factors and initial emergency response performance?

1.6 RESEARCH OBJECTIVES

Consistent with the above research questions, the general objective of this study is to examine the effects of team member resources and team structural factors on emergency response performance. The specific objectives of this study are:

a. To determine the initial emergency response performance among the fire fighting teams.
b. To investigate the relationship between team member resources, team structure, and initial emergency response performance.
c. To determine the moderating effect of cohesiveness on the relationship between team structure variables and initial emergency response performance.

1.7 SCOPE OF STUDY

The scope of this study involves fire fighters from the Fire and Rescue Department of Malaysia (FRDM). Fire fighters are intended in this study because they are recognized as one of the key players responding to an emergency in Malaysia (National Security Division Prime Minister's Department, 2003). In most emergency instances, the Fire and Rescue Department of Malaysia will act as the main agency in emergency response and mitigation operations. Fire fighters respond to emergency situation in teams. Fire fighting team may comprise of seven to nine team members, therefore the firefighters comprise of a unique group of subjects for this

study. Given that the fire fighters have to respond to many kinds of emergencies, which vary in terms of severity, scope, and complexity, this study nevertheless will focus on the initial emergency response performance.

1.8 SIGNIFICANCE OF THE STUDY

This study will look into aspects of emergency response team member resources and team structural factors, and their effects on initial emergency response. The findings from the proposed study may benefit both theory and practice. This study is important as it contributes to the body of knowledge by examining the determinants of emergency response performance from the team perspective. Previous studies looked at the impact of training, stress and coping, personality, preparedness, and outcomes of emergencies at individual level (e.g. L. Benson & Westphal, 2005; Flin & Slaven, 1996; Moran, 1998; Pons et al., 2005). This study will be among the first few studies that examine the team dynamics in the emergency response management. In addition, the study intends to contribute to the literature concerning emergency response team effectiveness by: (a) providing empirical evidence regarding determinants of effectiveness in fire fighting team; (b) explaining the relationship between team member resources, team structural factors and emergency response; and (c) providing a Malaysian perspective on the above issues pertaining to initial emergency response among fire fighters.

The study also intends to heighten the knowledge of public emergency response organizations and in-house emergency response team specifically

as they relate to emergency response performance. The findings of this study will provide empirical evidence as to an actual time taken by fire fighters to respond at the initial phase of the emergency response. This evidence can then be compared to the national standard response time set by the Fire and Rescue Department of Malaysia (FRDM). Further the findings of the present study could be used to assist in the recruitment and selection process of emergency workers including fire fighters. In addition the study will also help to identify relevant training programmes that can be designed to enhance emergency response performance. As such the proposed study might be of help in the review of national emergency plan ("PM: Review disaster plan," 2006), by recommending recruitment, selection, training, and team composition strategies for emergency response teams to help minimize the impacts of emergency incidents.

CHAPTER TWO

REVIEW OF EMPIRICAL STUDIES ON EMERGENCY RESPONSE

2.1 INTRODUCTION

This chapter begins by presenting some concepts on emergency response. This includes the current state of knowledge in the domain of emergency response. Next, empirical studies conducted on emergency response are discussed.

2.2 EMERGENCY RESPONSE

Emergency occurs all too often and results in great loss of life and property. Emergency includes disasters, catastrophic incidents, and smaller disruptive events. In recent years the emergencies have increased in number, severity, scope, and complexity of emergencies. For example, the severity of Flixborough explosion in the United Kingdom saw 24 hectares of factory area demolished within seconds. The explosion killed twenty eight people, and injuring fifty three people (Lagadec, 1982). Higher severity was accounted by the toxic release in Bhopal, India resulting in the death of more than 10,000 people. A very serious incident that happen not many years back was the nuclear reactor explosion in Chernobyl, which released radioactive material

into the atmosphere (Baverstock & Williams, 2006). In addition, the scope of the emergency was larger as the radiation exposure drifted across all of Europe, reaching Greece and Turkey to the south, and across over North Pole to touch Japan and the west coast of United States (Lagadec, 1990). Incidences that occurred in Flixborough, Bhopal, and Toronto were complex as it involved large amounts of hazardous substance. These hazardous materials could have decomposed itself into series of extremely toxic products. In Malaysia, the explosion at Bright Sparkles factory, which manufactured firecrackers in Sungai Buloh, killed 22 and injured 103 people. Until recently the earthquake off the coast of Aceh resulted in a tsunami, which claimed 68 Malaysian lives and 220,000 people on a global scale.

All this catastrophes necessitate greater attention being given to emergency management. Specifically effective emergency response is required to minimize the impacts of emergency incidents on life and property. The field of emergency response has attracted a number of researchers to examine the domain conceptually (Coleman, 2005; Ford & Schmidt, 2000; Granot, 1997). There is no one given standard definition of emergency response. For instance, Ford and Schmidt (2000) views emergency response as efforts to minimize the potential for and subsequent impacts of disasters on life and property. Granot (1997) on the other hand defines emergency response as a cooperative effort of a broad range of emergency community agencies. Coleman (2005) refers emergency response as putting the emergency preparation into action. On the whole, emergency response can be defined as activities conducted during the time period that begins with the detection of an event and ends with the stabilization of the situation by the

emergency agencies to minimize the impact of the incident on human suffering.

2.3 EMPIRICAL STUDIES IN EMERGENCY RESPONSE

Several studies have been undertaken in the field of emergency response mainly on training (e.g. L. Benson & Westphal, 2005; Markenson et al., 2005; Morey et al., 2002; Peterson & Perry, 1999; Rottman et al., 2005; Shapiro et al., 2004), stress and coping (e.g. Moran, 1998, 1999, 2001; Moran & Britton, 1994; Moran & Colless, 1995), personality (e.g. Flin & Slaven, 1996; Slaven & Flin, 1997), ambulance response (e.g. Al-Ghamdi, 2002; Altintas & Bilir, 2001), outcomes of emergency response (e.g. Pons et al., 2005; Pons & Markovchick, 2002), and preparedness (e.g. Paton, Johnston, & Houghton, 1998).

2.3.1 Training

Training provides opportunities to learn how to perform more effectively (Blanchard & Thacker, 1999). Emergency response training helps to prepare responders of the uncertainties and the urgency required in each emergency situation. Thus, emergency response training prepares responders to promptly detect, assess and respond effectively in actual emergency situations (Ford & Schmidt, 2000). For instance, Peterson and Perry (1999) examined the participant's reported impact from a hazardous material incident exercise. A simple quasi-experimental design was used

incorporating a scenario involving two classes of emergency responders: 25 professional fire fighters (treatment group) and 18 company's emergency response team (control group). All members of the experimental and control groups were asked to complete a questionnaire that included measures of selected perceptions before and after the exercise. The selected perceptions measured were degree of agreement on (a) teamwork, (b) response network, (c) training adequacy, (d) planning adequacy, (e) equipment adequacy, and (f) job risk. The results of the study indicate that participation in the exercise had impacts on perceptions of job risk, equipment adequacy, and training adequacy. Equipment adequacy and training adequacy were registered more positive assessment after the training. However, job risk was rated as less dangerous after the training. In the same article as above Peterson and Perry (1999) reported another investigation to examine the participant's reported impact from a medical mass casualty exercise among fire fighter paramedics. It was conducted among 36 fire fighters (experimental group) and 32 comparably trained fire fighters (control group). This study only included perceptions including (a) teamwork; (b) response network; (c) training adequacy; and (d) equipment adequacy. The task for experimental group was to sort individuals with medical injuries in accordance with their condition to determine priority in triaging. Findings indicate the exercise had impacts on perceptions of teamwork, response network, training adequacy and equipment adequacy. All perceptions registered more positive assessment after the training.

L. Benson and Westphal (2005) conducted a study to determine the training needs among emergency department staff in upstate New York. The

study found that the emergency response training provided among hospital emergency department staffs were not conclusive especially that focuses on the psychological impacts of terrorism. There was high level of suspicion among workers in the emergency department to identify signs and symptom of a terrorism threat. It was found that the number of training and methodology used to deliver the training also affects the hospital staffs preparedness. Furthermore hospital personnel are interested in using new technologies in preparedness related training. The study also highlighted that the self assessments of competencies were high compared to their actual knowledge. In a related study, Rottman et al. (2005) analyzed the degree to which participants improved their knowledge and sense of competency on key preparedness issues raised during a training. The study was conducted among public health professionals in Los Angeles. The results of the study indicated that public health professionals know significantly more following the training. Participating in training made the participants able to transfer both factual knowledge and concepts that are linked to recognize emergency preparedness core competencies. Morey et al.'s (2002) investigated the performance improvement through training among physicians, nurses, and technicians. The study found that team behaviors improved through formal teamwork training. Similarly Shapiro et al. (2004) examined performance improvement through training in the emergency department. The findings of the study indicated that teamwork behavior improved among emergency department staff as a result of training.

Training also shapes certain behaviors that are required in emergency work such as teamwork. For instance, Shapiro et al.(2004) conducted a study

to determine whether high fidelity simulation team training can improve clinical team performance when added to an existing didactic teamwork curriculum. The method employed was a single crossover, blinded and controlled observational study. The observation took place in a trauma centre at a teaching hospital for Brown Medical School in the United States. The subjects being studied were randomly selected among emergency department staff including nurses, technicians, emergency medicine residents, and attending physicians from one of the experimental sites. The subjects were already trained with the emergency team coordination course. Teams were randomized into two experimental and two comparison groups. Teamwork behavior was observed during pre-training and post training phase and observed twice in each phase and two observers scored team performance. The Team Dimension Rating Form was used to measure performance consisting of five seven-point behavioral anchored rating scales (BARS). The two experimental group teams received the simulator based intervention before the second observation period. The post intervention observations occurred within 2 weeks of the training. It was found that teamwork training enhanced performance and possibly reduced medical errors. The study also concluded that teamwork training conducted within simulated environment might offer an additive benefit to the traditional didactic instruction. In another study, Morey et al. (2002) found formal teamwork training among emergency department staff effectively improved team behavior, reduced errors, and improved staff attitudes.

Besides improving teamwork, attitudes, and reducing medical errors, training has also helped to prepare responders for emergency situation.

Markenson et al. (2005) for instance conducted a study to examine the association between training and comfort level in responding to various types of disasters. The participants of the study were 823 basic and paramedic emergency medical technicians (EMT) in the United States. Training was provided by the public health system consisting of training by initial training provider, health department, public health school, and medical school. The sample of study was stratified based on EMT status (EMT–Basic vs EMT-Paramedic), duration of registration for EMT (less than 1 year [new] or greater than 1 year [old]), and race (White, Asian, Black, Hispanic, or Native American). Comfort level was measured by the degree of comfortness, i.e. "very comfortable," "comfortable," "uncomfortable," and "very uncomfortable." It was found that, in general, the more training the participants receive, the more comfortable they are in providing emergency response. Specifically, participants' comfort in responding to bio-terrorism incidents was significantly associated with (a) the training they have had in bio-terrorism, and (b) the training in the area of public health emergency conducted by the health department.

2.3.2 Stress and Coping

Responding to emergency incident creates stress for emergency workers. Moran (1998) in a study conducted among fire fighters examined the influence of individual differences in emergency work experience on stress reactions. Data was obtained from 747 permanent paid fire fighters from the New South Wales Fire Brigades in Australia. Experience was measured by

years in emergency work and it was found to range between 0.5 and 38 years. Based on this range, experience was divided into three levels of equally space cut-off points of 12.5 years (12.5 years, 25 years and 37.5 years). Stress level was measured by respondents' stress rating, coping strategies, perception of risk of stress, and actual exposure to traumatic incidents. The data were analyzed using planned contrasts analysis of variance, which tested experience for a linear and quadratic trend across experience. The results indicated that the pattern of stress scores across levels of experience supports a quadratic relationship, which resembles an inverted-U. This means that stress is highest among the middle age group (12.5 – 27 years), and lowest among the 0.1 – 12.5 years and 27.1 – 37.5 years age groups. In a related study Moran (2001) found recruits with some prior emergency experience gave higher predictions of physical stress from fire fighting work and family stress. In addition experienced fire fighters rated higher the possibly usefulness of stress management programs compared to the recruits. Moran further found that lack of recognition by superiors, relying on seniors' decisions, personality clashes, recognition by media, and being the driver contributed high level of stress in normal course of fire fighters' duties among the recruits.

Perceptions and interpretations of events around the emergency incident also contribute to the experience of stress. The process in dealing with the stressors is known as coping. Moran and Britton (1994) in a study examined coping styles in a relatively inexperienced group of emergency workers, in the context of an anticipated future emergency or disaster. The study aimed specifically to examine general coping style in those who are

expected to respond in emergency environments. Secondly the study examines the differences between those with past experience in an emergency context and those with no experience. Finally it examined the differences between those involved in a professional capacity with emergency responding (including related government or official capacity) and those who are involved primarily on a volunteer basis. Subjects were participants in three workshops on managing disaster stress presented by the Wellington Emergency Management Office in 1994. A sample of 65 people ranging from permanent volunteer emergency workers, full-time local government staff of the emergency operation center and paid career emergency responders participated in completing a basic questionnaire of two coping questionnaire. The first part is about ways of coping (problem-focused and emotion-focused), and the second is on impacts of events (intrusive and avoidance). Results of the study indicated that problem focused way of coping was significant to all subjects. On the other hand emotion focused was found to be significant only to volunteers. The impact of events was intrusive to all subjects. Avoidance was found to be significant to volunteers. Past experience was found to be not significant to coping style.

Emergency responders report negative and positive reactions after being exposed to emergency incidences. Common negative reaction is stress and positive reactions usually referred as finding meaning or learning from incidents. An effort to examine the positive and negative reactions, and coping style after responding to emergency incidents was undertaken by Moran and Colless (1995). The study hypothesized that emergency service workers will report positive as well as negative reactions after responding to

emergency incidents. The study also hypothesized that individual coping style will be related to differences in reaction patterns. Data were obtained through questionnaire distributed to 747 paid fire fighters from New South Wales Fire Brigades in Australia. Respondents were asked to complete a checklist of reactions experienced (positive and negative) after stressful call-outs and coping styles. Respondents were divided into three coping groups (humour, suppression, and other). Findings indicate that emergency workers reported positive reactions following certain emergency incidents. Individual coping style is related to differences in reaction patterns where individuals using humour to cope were most likely to report positive reactions after a call out, compared to individuals using suppression to cope. Moran (1999) in another study analyzed recruit's expectation about positive and negative reactions in an emergency event. The study also compared the recruit's expectation with experienced fire fighters from New South Wales Fire Bridgade. Results of the study indicated higher positive reactions and lower negative reactions among recruits. In addition recruits with prior experience significantly rated higher for positive reactions. However, the study found using humour to cope was not related with the stress ratings.

2.3.3 Personality

Personality is another characteristic that have been examined with regards to emergency response. Flin and Slaven (1996) conducted a study to determine whether a personality questionnaire would be of value for predicting emergency command ability among offshore installation manager (OIM). A

psychological test and performance rating was administered during a four-day "Management of Major Emergencies", a simulated incident course at the Montrose Fire and Emergency Training Centre in United Kingdom. The data was collected among 154 OIMs using the Occupational Personality Questionnaire (OPQ) Concept 5.2. The OPQ was designed to measure personality characteristics relevant to work. The performance rating was based on the Offshore Petroleum Industry Training Organization's OIM Work Group's Unit of competence "Controlling Emergencies". It consisted of four elements of competence namely assessing the situation, decision making, communication, and stress management plus a rating for overall performance. The results indicated that five personality predictors (controlling, outgoing, conceptual, behavioral, and decisive) were found to be significantly correlated with performance measures. The study concluded that Occupational Personality Questionnaire may be able to make a limited contribution to selections of managers in relation to their emergency command responsibilities.

2.3.4 Ambulance Response

The studies earlier examined the preparation phase, which looked at among others training effectiveness, simulated exercises, and personalities of emergency commanders. Several studies were also conducted that looked at the recovery phase which examined reaction patterns and coping style among responders. Studies examining the response phase focused on the response of the emergency response resource. Al-Ghamdi (2002) conducted

a study to evaluate ambulance rescue time in Riyadh. The study also compared the response time with other countries. The study was conducted on seven ambulance station amounting to a total of 874 emergency cases. The elapsed times were recorded from call receipt to start of the ambulance, from station departure to scene arrival, from scene arrival to reaching the victim, from reaching the victim to scene departure, from scene departure to hospital arrival, from hospital arrival to departure for station, and from departure for station to station arrival. Results of the study indicated that variability exists in each time component. Time variability was found to be dependent to the severity of incidents. The study concluded that each time component obtained in this study can provide performance standards in judging the efficiency of an ambulance team. In a related study Altintas and Bilir (2001) examined the various times related to the ambulance activities among the Emergency Aid and Rescue Services' (EARS) in Ankara, Turkey. The results of the study suggested that number of ambulance vehicle should be increased to improve the response time. The study further stressed that there is a need for studies to determine and analyze the factors influencing ambulance response times.

2.3.5 Emergency Outcomes

Studies have reported existence of variation in emergency response times. The times obtained were linked to the emergency outcomes. Pons and Markovchick (2002) conducted a study among Emergency Department staffs of the Paramedic Division at Denver Health Medical Center in the United

States. The study investigated the relationship between ambulance response time and cardiac arrest survival. The study was conducted among 3490 patients who were admitted to the trauma surgery service or died in the Emergency Department of the Paramedic Division at Denver Health Medical Center. Patients were identified by the hospital's computerized trauma registry and time interval data were obtained directly from dispatch time-stamped records maintained by the Paramedic Division communications center. Patients were grouped according to the recommended guideline for ambulance response time to the scene, with group 1 having a response time less than or equal to 8 minutes and group 2 having a response time greater than 8 minutes. The ambulance response time is defined as the interval between notification of the Emergency Medical Services (EMS) agency (alarm) and the arrival of the ambulance at the incident scene. The two groups were compared for patient survival. Sub-groups were defined as follows: age (pediatric patients defined as less than 12 years of age versus adult patients equal or greater than 12 years old), mechanism of injury (blunt vs. penetrating), and Injury Severity Score (ISS 1-15, 16-25, >25). The study found that paramedics spend an average of 30 seconds more time on the scene and had a shorter return times to the hospital in the under 8 min response group. Survival for the response time groups showed no significant differences whether patients were evaluated in total or by the subgroups (mechanism of injury, patient age or ISS). However, in ISS group III (ISS>25) survival was significantly greater in the group with an ambulance response time over 8-minutes criteria. The study concluded that there were no effects of survival based upon the ambulance response time. In a related study Pons

et al. (2005) aimed at evaluating the effect of paramedic response time on survival to the hospital discharge among unselected patients. Findings of the study indicated that median response time was 5.8 minutes. In addition the study found that paramedic response time did not influence patient's outcomes. The study concluded that this might be due to the technological advances that changed the paradigm for emergency response to victims.

2.3.6 Preparedness

Like any other activity there are problems encountered by responders and responding agencies in coordinated response. Paton et al. (1998) in a study among emergency response agencies and organizations identified the problems encountered in responding to the Ruapehu volcano eruptions in the central North Island, New Zealand. A survey questionnaire was used to evaluate the warning and response to volcanic eruption. The questionnaire was distributed to all key player agencies and organizations which played significant role in responding to the eruptions. Open ended sections were also included in the questionnaire to allow respondents to qualify and illustrate their responses which later was analyzed using content analysis. The study was conducted among 30 organizations. The results of the study revealed that effectiveness of integrated response was muted by communication, co-ordination, training, and organizational constraints. Furthermore the study highlights the need to develop inter-organizational networks and the organizational structure, systems and management capability for a comprehensive, and integrated emergency management

systems. In addition, the study stressed that development of team approach in emergency response requires attentions to issues pertaining to group dynamics, process and decision making formats. In another study Aini et al. (2001) conducted a study to examine the emergency response preparedness among hazardous material transporters in Malaysia. Findings of the study indicated that there was insufficient management system in place for emergency preparedness and response. Furthermore the study found that participants revealed their profound of not being prepared to deal with emergency situations.

2.4 SUMMARY

Previous studies have focused on training, stress and coping, personality ambulance response time, emergency response outcomes, and preparedness. Generally, the studies pointed out that training has a positive impact on emergency response preparedness while emergency response work is always results in high stress. Studies have also highlighted the importance of personality in selecting the right candidate for commanding emergency operation work. Finally, studies have also examined the emergency response and the outcomes of emergency response. Given that no studies has looked at the team dynamics in emergency response management, this study is well placed to examine team dynamics of fire fighters in emergency response management.

CHAPTER THREE

THE ROLE OF FIRE AND RESCUE DEPARTMENT OF MALAYSIA IN EMERGENCY RESPONSE

3.1 INTRODUCTION

The Fire and Rescue Department of Malaysia (FRDM) is one of the leading agencies in emergency response management and mitigation work. The Fire and Rescue Department (FRDM) is a public agency and their services are provided free to the general public and this service is provided 24 hours a day, 7 days a week, and 365 days in a year. Being a public agency the Fire and rescue Department of Malaysia (FRDM) is not spared from public criticism and it has been unfavorably perceived by the general public ("Bomba nafi lambat tiba di tempat kejadian," 2008; "D-G: Firemen leave station 90 seconds after report," 2007; Habibu, 2007; Ismail, 2006; "Use shops to boost service, cops told," 2008; Yoon, 2007). The frequent complaints that have been leveled against the Fire and Rescue Department of Malaysia (FRDM) is that they take too long to respond to emergency situations. When this happens it can aggravate the number and severity of fatality, injury, and property damage.

Not withstanding the public view about the fire fighters it is incumbent to understand that any delay in responding to emergencies could

be due to a host of reasons, which at times are beyond the control of Fire and Rescue Department of Malaysia (FRDM). Among the main reasons for delay in responding to emergency situations which are beyond the control of Fire and Rescue Department of Malaysia (FRDM) are traffic congestion, calls were made late by the public, prank calls, weather condition, the road traffic condition, access to the emergency incident scene, prior knowledge on the emergency incident location and etc. Despite the above challenges fire fighters face in responding to emergency, the Fire and Rescue Department (FRDM) do make attempts to clarify through the documented time of call received ("Bomba nafi lambat tiba di tempat kejadian," 2008).

The negative perception of the general public can have a detrimental impact on the image and morale of fire fighters. The Director General of Fire and Rescue Department of Malaysia Datuk Hamzah Abu Bakar have responded to these criticism by stressing that the fire fighters are required to leave the fire station within 90 seconds in an emergency situation. ("D-G: Firemen leave station 90 seconds after report," 2007). Although two reporters from a local daily have investigated these claims and found that the claim by the Director General was supported (Yoon, 2007) nevertheless this did not stop the general public from criticizing the Fire and Rescue Department of Malaysia (FRDM) ("Bomba nafi lambat tiba di tempat kejadian," 2008).

The Fire and Rescue Department of Malaysia (FRDM) has to shoulder heavy responsibility in discharging their duties in fire fighting and rescue work. This chapter is about understanding of its history, structure, working arrangement, their key personnel, and the role of fire fighters in emergency management.

3.2 FIRE AND RESCUE DEPARTMENT OF MALAYSIA (FRDM)

The Fire and Rescue Department of Malaysia (FRDM) was established under the Ministry of Housing and Local Government on 1st January 1976. Among the functions of the Fire and Rescue Department of Malaysia (FRDM) are to prevent, extinguish, and control fire; to protect lives and property damage in the case of fire outbreak; to make sure availability, maintenance and monitoring of emergency exits; to conduct fire investigation; and finally, to provide humanitarian services to life and property in the occurrence of a disaster. The following is a brief history of the establishment of the Fire and Rescue Department of Malaysia (FRDM).

3.2.1 History of the Fire and Rescue Department of Malaysia (FRDM)

The Malaysian Fire Services was established in 1883 in conjunction with the establishment of the 15 members Selangor State voluntary fire squad headed by H. F. Bellamy. This squad was designated under the Cleanliness Board (*Lembaga Kebersihan*), which then later became a permanent Fire and Rescue Team in 1895. The service expanded throughout the country and was placed under the jurisdiction of the Municipal Council or Rural Board. In 1946, after the World War II, the Malayan Union Fire Services was formed and the headquarters was in Kuala Lumpur. During this time the fire fighting team was responsible for the task of fire extinguishment using steam generated pumps mobilized by horses. Then, the fire engine was only used to extinguish fire in four storey buildings and below.

Through the Federation of Malay States Agreement, the fire services were returned to the respective state administration under the jurisdiction of Municipal Council and Rural Board. In order to coordinate matters the Fire Services was established under the Ministry of Housing and Local Government. The Fire Department of the Federation of Malay States was unified under a department at the federal level on 1st January 1976. This was followed by the Fire Services of Penang, Kuala Lumpur and Malacca on 1st January 1977 and on 15th May 1981 the Fire Services of Sabah and Sarawak were merged into the federal administration.

On the 8th January 1997, the Cabinet Ministers agreed to change the current name of the Fire Services Department of Malaysia to the Fire and Rescue Department of Malaysia (FRDM) in recognition to the services rendered by the department. The Prime Minister of Malaysia officiated the change of the department's name, logo, and flag on the 21st February 1997 in Genting Highlands.

Currently, there are 238 fire stations located around Malaysia as depicted in Table 3.1. Selangor heads the list with the most fire stations while Perlis and Labuan has the least number of fire stations. The significant number of fire stations built in Selangor is because of the large scale of industrial activities and the high population density in the state. In general, fire stations are built according to the district requirements in each state. In capital cities more than one fire station is built to cope with high rates of emergency occurrence. Through the Ninth Malaysia Plan there have been proposals for more fire stations to be built to improve and upgrade the quality of fire and rescue services (*Ninth Malaysia Plan 2006-2010*, 2006).

Table 3.1

Total Fire Stations in Malaysia

State	Total Fire Stations
Perlis	3
Kedah	15
Penang	14
Perak	27
Selangor	29
Kuala Lumpur	16
Negeri Sembilan	13
Malacca	7
Johor	19
Pahang	20
Terengganu	15
Kelantan	15
Sarawak	24
Sabah	18
Labuan	3
Total	238

Source: Fire and Rescue Department Malaysia (FRDM), 2007

3.2.2 Organizational Chart of the Fire and Rescue Department of Malaysia (FRDM)

The organizational chart of Fire and Rescue Department of Malaysia (FRDM) consists of seven major divisions and one unit. The organization structure is divided into two main sections namely management and operations. Under the management section there are three main divisions i.e. management, training and human resource planning, and research, planning and development. The management division provides general services to the department, personnel, and finance so that activities of the department run smoothly and effectively. The training and human resource planning division

is responsible to provide knowledge and systematic fire training to fire fighters and to the department's clients and also to provide knowledge in fire safety to the public. The third division is the research, planning and development, which is responsible for quality research, planning, and implementation of development so as to improve and develop the fire services.

The operations section comprises four divisions and one unit involved in operational activities namely operations, prevention and safety, enforcement, engineering, and air unit. The operations division ensures that the fire services operations are efficiently, effectively, and systematically executed in accordance to the laws in protecting lives and properties, while the responsibility of the prevention and safety division is to ensure that the fire prevention aspects are implemented systematically and efficiently to protect lives and properties. The sixth division, which is the enforcement, sets and ensures the law under the Fire Services Act 1988 (Act 341) and other related acts pertaining to the department are complied by the owners of buildings or premises. The engineering division is responsible in making sure the department's engines and equipment is in good and functional order, economic, safe, and updated to render efficient services. Finally, the air unit division provides efficient and fast services through air-intervention when facing emergencies besides cooperating with the department or other rescue agencies by providing air transportation, air-ambulance, and air surveillance.

At the national level, a Director General, who is assisted by two Deputy Director Generals in-charge of management and operations respectively, administers the Fire and Rescue Department of Malaysia

(FRDM). The structure of the Fire and Rescue Department of Malaysia (FRDM) is depicted in Figure 3.1.

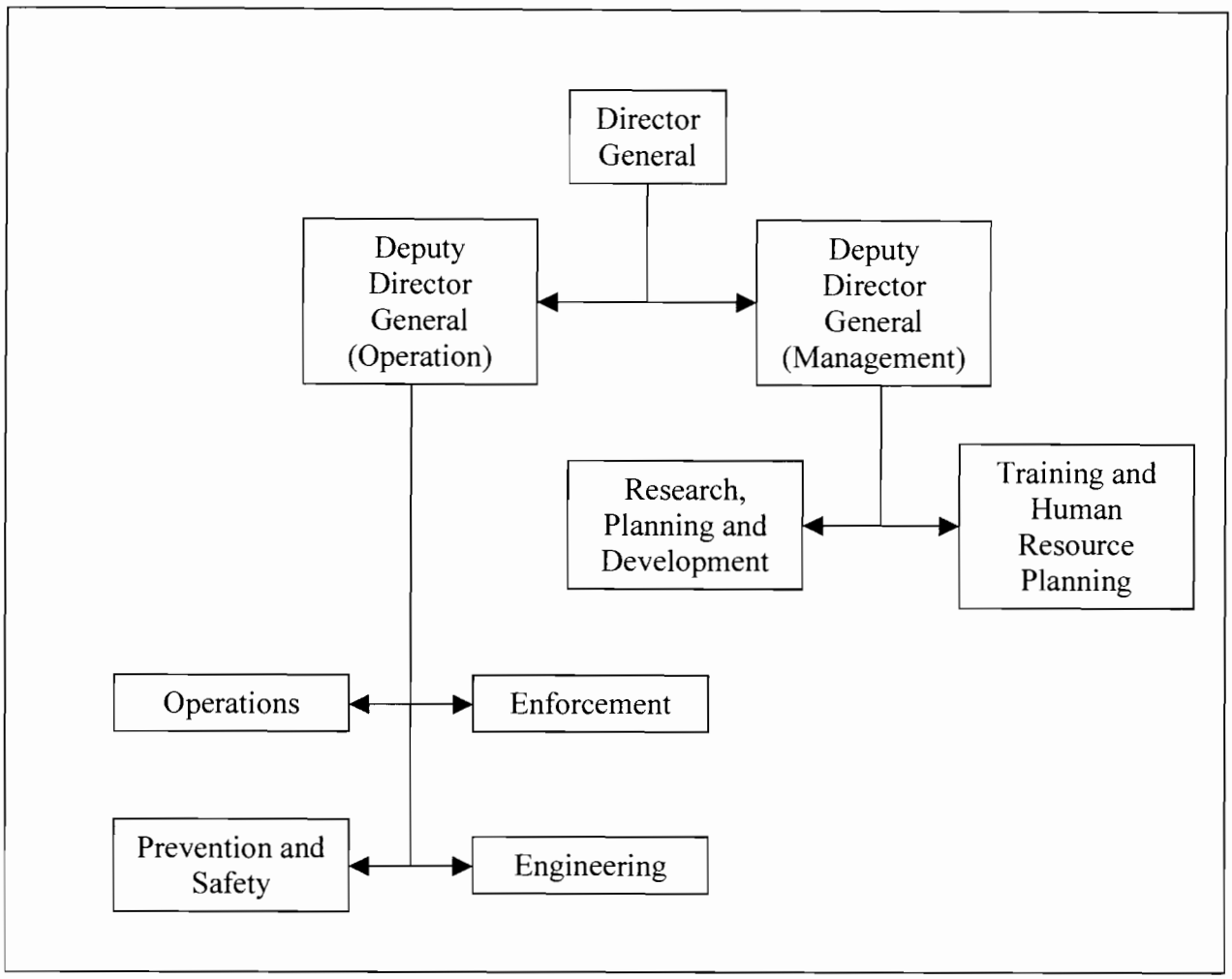

Figure 3.1 Structure of the Fire and Rescue Department of Malaysia (FRDM)

Source: Fire and Rescue Department of Malaysia (FRDM)

At the state level, the structure is similar, however, the State Director of the Fire and Rescue Department of Malaysia heads it. The State Director is assisted by the Deputy State Director and Assistant State Directors responsible for management, training and human resource planning, research, planning and development, operations, prevention and safety, enforcement, and engineering activities. Similarly, at the respective fire

stations, the Officer in-Charge of a fire station is assisted by fire officers to administer the above activities at the fire station level.

3.3 FIRE FIGHTERS

At the fire stations, the operational division is composed of teams working around the clock. In general, each team comprises of seven to nine members inclusive of the Chief Fire Officer (Ketua Pegawai Bomba) and Senior Fire Officer (Pegawai Bomba Kanan). Each fire fighting team is composed of a leader known as the Chief Fire Officer (Ketua Pegawai Bomba), who is assisted by a Senior Fire Officer (Pegawai Bomba Kanan), while the rest of the team are made of Fire Officer (Pegawai Bomba). The Chief Fire Officer (Ketua Pegawai Bomba) is responsible for leading the team during on-scene emergency response and also during other non-emergency activities. He reports directly to the Officer in-Charge of a fire station, while the Senior Fire Officer (Pegawai Bomba Kanan) reports directly to Chief Fire Officer (Ketua Pegawai Bomba), responsible for driving the engine to and from emergency incident, and positioning the fire engine at the emergency scene. Upon reaching the emergency scene he is also responsible in handling the pump operations, which includes opening and flushing the hydrant attached to the fire engine. Other Fire Officer (Pegawai Bomba) are responsible to undertake the tasks involved in fire fighting, rescuing activities, and staying guard at the control room to pick up and answer distress calls, activating the siren and making oral announcement to alert the other fire fighters.

The current study focuses on the contributions of fire fighters and their team dynamics on initial emergency response performance. Specifically, the effort is directed to investigate the effects of these determinants on initial emergency response performance. As such, this section will briefly describe the roles of fire fighters and their involvement in teams to perform their daily tasks. These descriptions would greatly facilitate in understanding the context of the current study. The following will describe the roles and the team dynamic that takes place among fire fighters in performing their daily tasks.

3.3.1 Roles and Functions of Fire Fighting Teams

As mentioned in the previous section fire fighters are responsible to undertake various fire fighting and rescue tasks which needs them to work in high interdependent teams (Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995) with great emphasis is given on interdependence among team members (Cameron, 1994; Cosgrave, 1996; Klinoff, 2003). These team members would perform various roles in two general situations namely before emergency and during the response to emergencies.

Fire fighters perform various non-emergency activities during their working hour when there are no emergency occurrences. Majority of these activities comprises of daily routine tasks and standby activities (see Appendix 1). Activities in this period can be assumed as the roles fire fighters perform before emergency occurrence. As mentioned above the daily routine activities includes morning assembly, equipment inspection, fire and rescue operation training, fire hydrant inspection, fire engine and pump

maintenance, pre-planning activities, landscape and building maintenance, marching practices, and sports. Majority of these activities are designed in such a manner to make sure the team members and the equipments prepared for any emergency occurrence (McHugh, 1995; Peterson & Perry, 1999). For exarrıple, equipment inspection, and fire engine and pump maintenance activities are daily routine tasks that help fire fighters to be prepared for emergency occurrence. Some of the tasks also act as refreshment training i.e. fire and rescue operation training, and pre-planning activities to members so that they are well equipped to face future emergencies because fire fighters face unusual problems in providing aid to the victims and property. As such, these routine tasks indirectly serves as a training needed to prepare fire fighters to promptly detect and respond effectively to an emergency incident (Ford & Schmidt, 2000).

Once the routine tasks discussed above by the fire fighters are completed, they will be on standby. However, while performing these routine tasks if there are an emergency situation the fire fighters will immediately stop the routine tasks and respond to the emergency. During the standby period, team members fill their time with various activities depending on the availability of resources in the respective stations. The majority of the fire stations are equipped with ASTRO satellite TV channel, and this enables the team members to view a variety of TV programs to keep them occupied. Some would take this opportunity to read or play indoor games such as carom, table tennis, and chess. During this time fire fighters also take some time to prepare food for either lunch or dinner. However, this is not a norm in

all stations; in some stations members rotate to buy food for everyone else when cooking is not allowed at the fire station.

The second situation is during the response to an emergency incident, which includes preparation for emergencies, and the process of responding to emergencies. At the beginning of the shift, team members would prepare themselves for potential emergencies in a particular day by inspecting the equipment at the start of the shift. Once inspections are completed, each and every fire fighting team member would load their attires namely fire helmet, gloves, fire jacket, and rescue attires in to the fire engine. In addition, all the fire engine doors would be left open all the time to enable quick response.

The response starts immediately when the control room activates the siren and makes an oral announcement through the PA system upon receiving a distress call. The announcement would indicate the type/severity of emergency marked by "Gempar" code-red representing the most severe incident, yellow moderately severe, and green the least severe. Examples of "Gempar" red incidencts are house fires and factory fires, while "Gempar" yellow incidencts are road traffic accidents and electrical power station fires, and examples of "Gempar" green incidencts are forest fires and bush fires. Upon receiving the distress call, the team member in the control room will decide the type of "Gempar" based on the nature of emergency. The announcement is aimed at informing the team members to wear the appropriate attire. Such announcement enables the responders to put on appropriate attire for the tasks. Irrespective of the "Gempar" color code all fire fighters will treat the announcement as an emergency that will require quick and speedy response.

When announcements are made, the Chief Fire Officer (Ketua Pegawai Bomba) who will then brief the Senior Fire Officer (Pegawai Bomba Kanan) on the details of the emergency scene location will pick the detailed information of the emergency from the control room. The other team members will be briefed while on the way to the scene. As such, the team leader plays a vital role where he needs to respond quickly and at the same time pick up the information regarding the emergency occurrence. During the initial emergency response, individual team member would be racing against time to get on to the fire engine as quickly as possible. There were instances where some team members were left behind because they were not quick enough in responding. When this happens, the Chief Fire Officer (Ketua Pegawai Bomba) will seek for an explanation from the particular member after the team returns from the task, and if he is not satisfied with the explanation given, the incident will be referred to Officer in-Charge of a fire station for further action.

3.4 SUMMARY

This chapter has given a brief overview of the Fire and Rescue Department of Malaysia (FRDM). In addition, the chapter has explored the operations of a fire station, and has provided a realistic preview of the roles fire fighters play in performing their duties. Next, the following chapter will discuss the empirical evidence on team and team performance.

CHAPTER FOUR

EMPIRICAL EVIDENCE ON TEAM AND TEAM PERFORMANCE

4.1 INTRODUCTION

This chapter presents a review of literature on team performance, team member resource, team structure, and the possible moderator to be included in the investigation. The literature review, examines the current state of knowledge in the domain of team member resources, team structure, and the possible moderator.

4.2 TEAM PERFORMANCE

Teams perform better than independent individuals on a wide range of activities (Kerr & Tindale, 2004; Laughlin, Hatch, Silver, & Boh, 2006). Work teams are supposed to have potential to enhance member motivation, production, and satisfaction (Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996; Gladstein, 1984; Hackman, 1990; McIntyre & Salas, 1995). In a review conducted by Ford & Schmidt (2000) it is argued that emergency response requires teams of interdependent members to enhance real world performance. Individual competency is a necessary, but

not sufficient, condition for overall performance (Salas, Dickinson, Converse, & Tannenbaun, 1992).

Researchers have studied groups and the behaviors/interactions of members since the beginning of the group dynamics movement of the 1930s (Ingram, Teare, Scheuing, & Armistead, 1997). There have been various definitions offered for group (Guzzo & Shea, 1992). Guzzo and Dickson (1996) defines 'work group' as made up of individuals who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems (e.g. community, organization, etc), and who perform tasks that affect others such as customer or coworker. There is a subtle difference between group and team. Katzenbach and Smith (1993) assert that groups become teams when they develop a sense of shared commitment and strive for synergy among members. Meanwhile Sundstrom, Meuse, and Futrell (1990) defines a team as a group of individuals working interdependently to achieve a common goal. In summary team can be defined as a group of individuals working interdependently and develop a sense of shared commitment and strive for synergy among members to achieve a common goal.

Work teams do not exist in isolation. Teams are composed of individual members working together. It also has an internal structure that defines the member roles, norms, and leadership. According to Robbins (1993) team performance depends on two main component namely team member resources and team structure. Team member resources refer to the member's contribution that influences the whole team's outcomes. These

include team member ability and team member personality characteristics. On the other hand team structure refers to the internal team factors that would influence the team outcome. The team structure defines the member's demography, roles, norms, and leadership. The group behavior model proposed by Robbins (1993) postulates that team member resources and team structure can independently predict the team performance. In addition the interaction between team member resources and team structure can also predict the team performance.

4.3 TEAM MEMBER RESOURCES

A work team method of job design requires individuals to interact at varying degree of interdependency to achieve shared outcome (Salas et al., 1992). In other words, team performance is, to a large extent, dependent on the resources that its team member individually bring to the team (Robbins, 1993). According to Barrick, Stewart, Neubert, and Mount (1998) team output depends on individual contributions, it follows that greater levels of contributions among team members should lead to higher team performance. Moreover, English, Griffith and Steelman (2004) have identified characteristics of individual team members as one of the focus in team research. The following will present a review of literature on team member resources that are antecedent to the team performance namely team member ability, and team member personality.

4.3.1 Team Member Ability and Team Performance

Part of team's performance can be predicted by assessing the task related and intellectual abilities of its team members (Robbins, 1993). Team member ability will help to understand the crucial member abilities for attaining the group outcome. The task outcome expected from emergency responders in particular to the response phase is responding with a sense of urgency. The urgency in initial emergency response reflects in speed of response. The speed in the initial response will be reflected in minimizing the impact of an emergency incident. In particular to emergency response team member ability in the initial emergency response, the task related abilities is more relevant than the intellectual abilities. More specifically, it concerns with the physical ability. The review of literature on physical ability suggests that most of the studies were conducted at individual level. In team based studies, member's abilities are measured on individuals and later aggregated into team indexes. Thus understanding the relationship between individual physical ability and individual performance will give a general understanding and serve a basis to understand the relationship at a collective level.

In an experimental study among twenty professional fire fighters Rhea et al. (2004) investigated the relationship between physical fitness and job performance. Subjects were required to complete a questionnaire identifying descriptive information, including age, gender, years of professional fire service, and past injuries that might affect their performance on the selected test. A wide range of fitness tests was employed in an attempt to measure fitness in the areas of cardiovascular endurance, anaerobic endurance,

muscular strength, local muscular endurance, and body composition. Cardiovascular endurance was measured by the Cooper 12 minute run. The subjects ran as far as possible on an open track in 12 minutes and recorded the distance traveled, which represented the performance score. The anaerobic power/endurance was measured based on a 400-m sprint on an outdoor track and timed to measure anaerobic endurance. A five repetition maximum (5RM) test with free weights was performed for the flat bench press and back squat to identify muscular strength. Handgrip strength was measured by the use of a hand dynamometer. The local muscular endurance was measured based on maximal repetitions in a variety of exercises, including bench press, squat, bent-over row, dumbbell bicep curls, and seated dumbbell shoulder press. The resistance for each exercise was set at weights that were judged to be similar to the demands faced in various fire fighting tasks by fire department personnel. Body composition was measured by whole-body plethysmography. One trained technician performed the Body Pod testing. The job performance was measured based on four separate tasks performed, each as quickly as possible and timed for performance score. The test included a hose pull, stair climb while carrying a high-rise hose pack, simulated victim drag, and equipment hoist. Fitness measures were combined into a grand fitness score by adding all tests together (excluding 400-m sprint and percent body fat) so that higher score represented greater fitness. The performance measure was also added together to create a grand performance time with lower scores representing superior performance. The findings of the study indicated that the job performance and physical fitness are significantly related. However the study

did not find cardiovascular fitness to be related to job performance but later argued that, in actual fire scene cardiovascular fitness is important. In another study, Williford, Duey, Olson, Howard and Wang (1999) examined the relationship between physical fitness and job performance in a simulated fire suppression tasks among 91 male fire fighters employed by the Montgomery Fire Department, Montgomery, USA. The results of study showed that physical fitness was found to be related to job performance. Specifically the study found height, weight, 1.5 mile run explaining the variance in job performance. In addition the cardiovascular fitness (1.5 mile run) was found to be explaining 50% of the variance in job performance. Meanwhile in a study examining the relationship between physical fitness and performance among Icelandic first division soccer teams Arnason et al. (2004) team performance was not related to team members height, weight, and BMI.

In particular to the initial emergency response, speed is been identified as important element among emergency responders (Baldwin, 1994). The following review of literature will focus on the studies that examine the determinants of speed among human being. In a study among 155 healthy men and women Samson et al. (2000) examined the relationship between sex, height, and weight's differences and their effects on functional mobility. The height and weight of subjects were measured in a room free from external distractions. The weight was measured to the nearest 0.1 kg and height to the nearest mm using a wall-mounted stadiometer. The functional mobility was assessed quantitatively by asking the subjects to rise from a standard arm chair (46cm high), walk 3 meters, turn around and sit down

again as fast as possible. In addition subjects were asked to perform the modified Cooper test i.e. a 2-minute walking test, which appears to be highly correlated with the 12-minutes Cooper test and is a reproducible measure for endurance. The subjects were asked to walk as fast as possible for 2 minutes and the distance is recorded in meters. The results of the study demonstrated that height and weight affected the differences in functional mobility. In other words differences in height and weight contribute to the differences in walking speed (distance). In another study among 53 healthy men and women Troosters, Gosselink, and Decramer (1999) investigated anthropometric variables that is height, weight, and body mass index influence on performance in six minute walking distance (6MWD). Findings indicate that age, height, weight, and sex explained 66% of the variability in 6MWD. However in a similar study, conducted among 409 subjects from a large Health Maintenance Organization in western Washington State, USA, Buchner, Larson, Wagner, Koepsell, and DeLateur (1996) found age, and weight to be significantly predicting gait speed, while sex and height did not. The result of the study also found height was not to be an independent predictor of gait speed after controlling for strength and weight.

In summary team member physical ability is found to be related to the job performance among fire fighters. Speed is the task relevant ability required in initial emergency response and studies have shown that height and weight are the significant predictors. In addition it is also found that the cardiovascular endurance explains a high variance of fire fighter's job performance. However the studies discussed above examined individual physical fitness and it's relation to individual performance. In a team setting

individual fitness can influence team performance. This study will examine how physical fitness of team members influence team performance.

4.3.2 Team Member Personality and Team Performance

Personality traits affect team performance by strongly influencing how the individuals will interact with other team members (Robbins, 1993). Due to the interdependent nature of teams and interpersonal demands that interdependence poses, personality is commonly associated to team performance (Moreland & Levine, 1992).

Morgeson, Reider, and Campion (2005) investigated the influence of different aspects of personality on contextual performance in a Midwest mill of a national steel corporation in the United States. Personality was assessed using the Personal Characteristics Inventory (PCI) to explicitly assess the "Big Five" personality characteristics. Meanwhile contextual performance was assessed using department manager's rating of individual team members on a five-point scale, with higher ratings indicating better performance. The items included cooperating with team members, going out of his or her way to help other team members, etc. Findings show that the higher team means level of conscientiousness, extraversion, agreeableness, and emotional stability were related to higher contextual performance. In a related study Barrick *et al.* (1998) examined 51 teams from manufacturing facilities and found higher team means level of conscientiousness, agreeableness, and emotional stability useful in predicting higher team effectiveness. Similarly Neuman, Wagner, and Christiansen (1999) found higher conscientiousness

and agreeableness to be positively predicting higher performance among 82 teams of a large retailing organization with stores located across United States. In another study among military service team in the southeastern United States at an Air National Guard base Halfhill, Nielsen, Sundstrom, and Weilbaecher (2005) found conscientiousness and agreeableness to be positively correlated with group performance. Similarly Neuman and Wright (1999) found higher conscientiousness and agreeableness predicted higher work team performance among human resource representatives at local stores, across the United States. In another study among brainstorming group, Bolin and Neuman (2006) found higher emotional stability significantly predicted higher good ideas and higher extraversion significantly predicted higher quality ideas. In a related study, Barry and Stewart (1997) examined the effect of group's personality composition of conscientiousness and extraversion on group outcomes among groups of MBA students and indicated that conscientiousness was not related to group quality of problem solving while extraversion was negatively significant to group problem solving. Meanwhile Kichuk and Wiesne (1997) conducted an experimental study among first year undergraduate engineering students and found conscientiousness, extraversion, neuroticism, and agreeableness to be not related to performance of a product design team. Similarly, Van Vianen and De Dreu (2001) found conscientiousness, agreeableness, emotional stability, and extraversion not related to performance among teams placing underground cables and pipes. Besides measuring the effects of personality traits on team performance, several studies also investigated its association

with individual performance. The following are reviews of studies investigating the effects of personality traits on individual performance.

Tay, Ang, and Van Dyne (2006) conducted a study to determine the influence of personality traits on interviewing self efficacy and interview success. The study was conducted among graduating accounting seniors in the business school of a large state university in the western part of Singapore. Interviewing self-efficacy was measured with five adapted job search self-efficacy scale (Wanberg, Kanfer, & Rotundo, 1999) while interview success refers to the total number of job offers each respondent received based on CPA firm records. Personality was measured with the Personality Characteristics Inventory (PCI) (Barrick, Mount, & Strauss, 1993) to explicitly assess the "Big Five" personality characteristics. The finding indicates that student's conscientiousness, and extraversion were positively related to initial interviewing self-efficacy after controlling gender, number of applications, and number of interviews. However, it was found that student's emotional stability was not related to interviewing self-efficacy. Similarly, the study also found student's conscientiousness and extraversion was related positively with interview success however, student's emotional stability was not related to interview success. Similarly, Nguyen, Allen, and Fraccastoro (2005) found student's emotional stability was not a significant predictor of academic performance. In addition, the study found student's extraversion negatively predicted academic performance while student's conscientiousness and agreeableness positively predicted academic performance. In a related study, Barrick, Parks, and Mount (2005) found student's emotional stability and conscientiousness were not related to

supervisory rating of interpersonal performance while higher student's extraversion and agreeableness significantly predicts higher supervisory rating of interpersonal performance. In another study among service workers in the food industry, Brown, Mowen, Donavan, and Licata (2002) found higher agreeableness, and higher emotional stability predicts higher customer orientation while extraversion and conscientiousness does not predict customer orientation. In addition, the study also found conscientiousness to be positively predicting both self-rated and supervisor rated performance while agreeableness positively predicting supervisor rated performance. Similarly, Stewart and Carson (1995) conducted a study to examine the effects of personality on job performance among individuals employed at an elite hotel and resort community located in the southeastern United States. The findings indicated that conscientiousness and agreeableness were positively correlated with job performance while extraversion was negatively related to job performance. Meanwhile, in a study among employees of a large regional health and fitness center Judge and Erez (2007) found only higher conscientiousness significantly predicted higher job performance while emotional stability, agreeableness, and extraversion did not have significant effects on job performance. Meta analyses were also conducted on studies that measure Big Five personality traits as predictors of job performance. The following are reviews of the meta analyses studies investigating the effects of personality traits on job performance.

Hurtz and Donovan (2000) undertook a meta-analysis to summarize the body of research that has developed in recent years where actual

measures of Big Five were used as predictors of job performance. The literature search was divided into four methods (computer-based search, manual search, conference programs search, and citation search) to obtain validity coefficients. Studies included in the analysis met three criteria (a) studies using actual workers as participants; (b) personality measures that was explicitly designed from its inception to measure the Big Five (NEO Personality Inventory (NEO-PI), including the revised NEO-PI-R and five factor inventory (NEO-FFI), Goldberg's Big Five markers, the Hogan Personality Inventory (HPI), and the Personality Characteristics Inventory (PCI)), and (c) inclusion of an explicitly measure of job performance or training performance as a criterion of interest. The study further performed a separate analysis by partitioning the criterion domain used when predictive validity of Big Five into task performance, job dedication, and interpersonal facilitation. The results indicate that conscientiousness exhibits the highest estimated true validity in predicting job performance. Emotional stability and extraversions appear to have low but stable true validities especially in sales job while emotional stability, and agreeableness exhibits rather low but stable true validities especially among customer service jobs. In addition, conscientiousness predicted all three criteria (task performance, job dedication, and interpersonal facilitation). Emotional stability appeared to have a low but stable true validity across all job performance criteria (task performance, job dedication, and interpersonal facilitation) while agreeableness does appear to influence ratings of interpersonal facilitation. Similarly, Hough (1992) in a meta analysis in understanding the relationship

between personality traits and job performance found conscientiousness to be the overall best predictor of job performance.

In summary team personality is found related to individual and team performance. In measuring team personality usage of the team referent instrument is not significantly better predictor than the individual referent instrument (English et al., 2004). The individual responses will be aggregated into team level construct (James, Demaree, & Wolf, 1984).

4.4 TEAM STRUCTURE

Team performance is not merely the summation of its individual member contributions (Robbins, 1993). Several researchers have hypothesized that variation in team performance can be explained by differences in team structure (S. G. Cohen & Bailey, 1997; Gladstein, 1984; Hackman, 1987; Manz, 1992; Stewart & Barrick, 2000; Wageman, 1995). Team structure shapes the behavior of members and makes it a possible determinant in explaining and predicting the team performance (Robbins, 1993). According to Greenberg and Baron (1997) team structure keeps the team member together and to function as a unit. Meanwhile Stewart and Barrick (2000) defines team structure as team relationships that determine the allocation of tasks, responsibilities, and authority. In summary team structure can be defined as relationships that keep team member together by allocating tasks, responsibilities, and authority to achieve common goals. The following will present a review of literature on team structure that are antecedent to the team performance namely team demography, leadership, roles, and norms.

4.4.1 Team Demography

The team demography refers to the degree to which members of a team share a common demographic attributes which is a structure property of a team (Robbins, 1993). Teams are composed of cohorts, which are defined as members holding a common attribute. Te following will present a review of literature on demographic variables comprising of age and tenure.

4.4.1.1 Age and team performance

Age is found to be related to performance at individual level studies. Ali and Davies (2003) conducted a study to determine the effects of age on job performance of rubber tappers, who are blue-collar workers who live and work on rubber plantations in Malaysia. The study was conducted among 1,047 rubber tappers (457 men and 590 women) from nine Malaysian rubber plantations belonging to one company. Performance was determined by using an objective measure, which is the total crop, produced by the rubber tappers derived from the crop register records. Total crop is measured in kilograms and represents the total output of rubber produced. The results of a polynomial regression analysis to test the curvilinear effects of age on job performance with respect to the total crop found the relationship between age and job performance took the form of an inverted U, with output increasing with age, peaking in the mid-40's and declining thereafter. In another study examining the effects of age on job performance (quality of performance and speed of servicing) among 1,308 male service engineers in the United

Kingdom Sparrow and Davies (1988) also found an inverted U relationship between age and quality of performance. In addition the study also found age to be having a minimal effect on speed of servicing.

In understanding the influence of age on performance at a collective level, the age is examined based on its dispersion among members in a team. Pelled, Eisenhardt, and Xin (1999) in a study among 45 teams from the electronic divisions of three major corporation examined the indirect affects of work group diversity on cognitive task performance. Age diversity was measured based on its dispersion among members in the team using the coefficient of variation. Performance was measured by using a 5-point Likert scales where each team's manager rated the team on two dimensions namely efficiency of team operations and number of innovations or new ideas introduced by the team. The results of the study found to be indicating that age diversity was not related to group performance. Similarly, Kang, Yang, and Rowley (2006) found age diversity does not predict team effectiveness among the Korean software project development team. In the study by Kirkman, Tesluk, and Rosen (2004), team performance was measured using three different indicators namely team empowerment, team member rated team effectiveness, and external leader rated team effectiveness, similar to the above studies, age diversity was found to be not a significantly predicting of neither of the team performance measure. On the same note, Timmerman (2000) in a study among professional baseball and basketball teams found age diversity was unrelated to team performance in low interdependence sport i.e. baseball, however, negatively related to team performance in high interdependence sport i.e. basketball. Such finding indicates that the level of

interdependence among team member could a possible moderator in explaining the relationship between age diversity and team performance. Besides measuring the effects of age diversity on team performance, several studies also investigated its association with organizational performance. The following are reviews of studies investigating the effects of age diversity on organizational performance.

Ely (2004) conducted a study to investigate the relationship between retail branch performance and age diversity. The sample consists of 486 retail branches of the bank located primarily in and around a large city in the northeastern United States. Data was collected from two sources: (a) archival data on the sex, age, and tenure of each employee in each branch; and (b) branch performance data used to allocate bonuses to branches. Age diversity was measured using coefficients of variation. While team performance was measured on (a) the total performance score, as an overall measure of branch performance; (b) percentage goal attainment in revenue from new sales; (c) percentage goal attainment in customer satisfaction, which is a composite score assessed from independently conducted surveys of approximately 50 randomly selected customers for each branch; (d) percentage goal attainment in the number of customer referrals to bank services, which are referrals by employees from one product to another that resulted in a sale; and (e) percentage goal attainment in sales productivity, which is the total revenue from new sales relative to total salary expenses. The study found age diversity among retail branch employee not a significant predictor of retail branch performance. In a related study, Siciliano (1996) examined the effects of board member's age diversity on organizational

performance among corporate social organizations. The study found age diversity had no relationship to the organization's efficiency measure or its social performance ranking. Similarly, in a study conducted among electronic component manufacturing firms Simons, Pelled, and Smith (1999) found age diversity of top management teams did not predicted changes in sales. Unlike the three studies above, a study in retailing setting by Leonard, Levine, and Joshi (2004) revealed that employee's age diversity was negatively associated with sales. In other words, higher age diversity among employees resulted in lower average monthly sales. Another study that revealed similar direction of relationship was conducted by Olson, Parayitam, and Twigg (2006) among firms from the telecommunication industry that engage in merger and acquisitions. The study found higher employee's age diversity would result in lower merger and acquisition activities. Similarly finding was obtained by Simons et al. (1999) where it was found that age diversity of top management teams negatively predicted changes in profitability. The result was translated as top management teams with higher age diversity produced smaller changes in organizational profitability. On the same note, Richard and Shelor (2002) found higher age diversity among top management teams results in lower return on assets. Wagner, Pfeffer, and O'Reilly (1984) also found age diversity among top management group members from Fortune 500 companies negatively associated with firm's financial performance. However, Richard and Shelor (2002) found age diversity among top management teams positively associated with sales growth. A large number of studies investigated the effects of age diversity on

innovation, and turnover. The following are reviews of literatures related to the age diversity and innovation relationships.

In a study among top management teams in the finance service industry by Bantel and Jackson (1989) investigated the effects of age diversity on technical innovation, administrative innovation, and total innovation. The study revealed that age diversity does not significantly predict any of the three criterion variables. Similarly, Cady and Valentine (1999) found quantity and quality of innovative ideas generated was not predicted by team member's age diversity. Unlike the above two studies, Olson et al. (2006) found higher team member age diversity resulting in lower innovation intensity among firms from the telecommunication industry. The next section compiles the reviews of literature associated with the relationship between age diversity and withdrawal behavior.

Bayazit and Mannix (2003) conducted a study to examine the relationship between age diversity and members' intention to remain in their team. The study was conducted among 83 second year MBA students randomly assigned to 28 three-person team participated in a negotiation simulation. Age diversity was measured using coefficient of variation (mean age divided by standard deviation of the team), while intention to remain was measured using 3 items focused on members' desire to stay in or leave the team. The results indicated that age diversity negatively associated with intention to remain in a team. In other words, higher age diversity among team members is associated with higher turnover among team members. Similarly, S. E. Jackson et al. (1991) in a study among bank holding companies found higher top management team's age diversity associated

with higher turnover among members. On the same note, a study among top management teams in a sample of Fortune 500 companies by Wagner et al. (1984) found higher age diversity explains higher turnover. Meanwhile, in a related study among 40 firms listed on the Tokyo Stock Exchange Wiersema and Bird (1993) examined the link between top management age diversity and turnover. The findings of the study found age diversity to be a significant predictor of turnovers among executives under 65 years old. Finally, there were several attempts investigating the effects of age diversity on other work outcomes, namely, customer-oriented prosocial behavior, strategic change, perceptions of teaming consideration, communication frequency, and creative behavior. The following are reviews of literatures related to these work outcomes.

Pelled, Cummings, and Kizilos (2000) conducted a study to examine the relationship between age diversity and customer-oriented prosocial behavior. The study included 223 work units of a firm that manufactures, markets, and distributes nonalcoholic beverages. Data on employee age was obtained from corporate personnel records and used the coefficient of variation to represent age diversity. The dependent variable of the study i.e. customer-oriented prosocial behavior was formed using five items from the firm's questionnaire. The items asked about units member's perceptions of the extent to which their co-workers: (a) come up with good ideas to exceed what the customers say she or he wants; (b) act on the ideas to exceed customer expectations; (c) resolve customer problems immediately; (d) anticipate customers' future needs; and (e) are willing to adapt to meet the changing needs of customers. Response anchors were, 1 = strongly

disagree, 2 = disagree, 3 = have mixed feelings, 4 = agree, and 5 = strongly agree. The findings of the study indicated that work unit's age diversity was not related to customer-oriented prosocial behavior. Similar result was also obtained by Wiersema and Bantel (1992) in a study among large manufacturing firms listed in Fortune. The study found age diversity has no significant effect on corporate strategy change. On the same note, Cady and Valentine (1999) found age diversity is not a significant predictor perceptions of teaming consideration. Unlike the other studies, Zenger and Lawrence (1989) found age diversity negatively predicts communication frequency among outside and inside project groups, indicating higher age diversity among group members resulting in lower communication frequency. The study by Choi (2007) initially indicated that age diversity was not a significant predictor of creative behavior however, further analysis revealed that higher age diversity among work unit members resulted in lower creative behavior specifically in the sub-sample of smaller work unit.

In summary age is found to be related to job performance at individual level of study. However when measuring age at team level, is necessary to measure the dispersion of age among team members. The effects of age diversity have been examined in relation to team performance, organizational performance and other outcome measures. The findings of these studies have produced some inconsistent results.

4.4.1.2 Tenure and team performance

Employees gather experience and training throughout the working duration, which turns out as an asset that increases job performance. Sparrow and Davies (1988) examined effects of individual tenure on individual job performance. Data were gathered from 1,308 male copy-duplicator machines service engineers based in various regions of the United Kingdom. In order to ensure that sufficient observations remained within each cell, only two level were fixed for the variable of tenure, above (9 years and over) and below (1-8 years) the median tenure length respectively. Performance were measured based on quality of service achieved and the speed of servicing. Quality of service was measured when an engineer services a machine he records the number of copies the machine has made after his service, as well as the time elapsed since the last service. The second performance measure was speed of servicing. It was measured by the time spent working on each service is logged in hours, and records are obtained for all logged services by each engineer for each product family. An average time was obtained for each complexity level for each engineer, expressed in hours. The results of the study indicated that tenure was not significant in terms of quality of service however was significant with speed of servicing. Engineers whose tenure exceeds 8 years spend on average 1.60 hours servicing machines, which is significantly longer than 1.51 hours spend on each service by engineers whose tenure was 8 years or less. In a related study, Ali and Davies (2003) examined the effects of tenure on job performance among 1,047 rubber tappers in Malaysia. The results of the study found tenure to be related to the

total crop production. In addition is was found that tenure explains performance better than age (Ali & Davies, 2003; Giniger, Dispenzieri, & Eisenberg, 1983; Sparrow & Davies, 1988).

Similar to the investigation of the relationship between age and performance at collective level, tenure is also examined based on its dispersion among members in a team. For instance, Kang et al. (2006) conducted a study to understand the demographic and cognitive similarities that are important to software project development team's effectiveness in Korea. Age and tenure similarities were measured using coefficient of variation with an additional minus sign before the value to convert its meaning to the degree of similarities. Team effectiveness was measured using quality and quantity of team output, and team commitment. The study found member's tenure diversity does not predict team effectiveness. Similarly, Kirkman et al. (2004) found member's tenure diversity as a non significant predictor of neither team empowerment, team member rated team effectiveness, or external leader rated team effectiveness in a study among textile manufacturers, high technology manufacturer, and insurance company that had formally implemented work teams. On the same note, in a study examining the effects of tenure diversity on team performance among R&D teams by Reagans and Zuckerman (2001) also found member's organizational tenure diversity did not significantly predict team productivity. Unlike the three studies, Pelled et al. (1999) in an effort to examine the effects of tenure diversity on cognitive task performance among teams from electronics corporations found tenure diversity to be positively related to cognitive task performance. The result indicates that teams composed of

members with higher age diversity would be able to perform better. Along similar lines, Ancona and Caldwell (1992) provided further empirical evidence by demonstrating that tenure diversity are reflected in effective team task. In this study, Ancona and Caldwell (1992) found teams composed with members of higher tenure diversity were more effective in their task processes. In addition to team performance, several studies have been directed at examined the effects of age diversity on organizational performance. The related reviews of literature are on the following section.

For instance, Carpenter (2002) conducted a study to examine the relationship between top management team diversity and firm performance among large and medium-sized firms. In this study firm performance was measured using return on assets (ROA) while tenure diversity was gauged using the coefficient of variation. The results of the study indicated that top management team tenure diversity was not a significant predictor of firm performance. Similarly, Michel and Hambrick (1992) also found top management team tenure diversity was not a significant predictor of firm performance among Fortune 500 firms. On the same note, Simons et al. (1999) conducted a study to examine top management team tenure diversity and it's effects on company financial performance. In this study, it was found that tenure diversity among top management teams did not significantly predict either profitability or sales among electronic component manufacturing firms. However, in the study by Ely (2004) among retail branches of the bank found branch level tenure diversity negatively associated with organizational performance. Specifically, retail branches with higher age diversity would produce lower new sales revenue, customer

satisfaction, and sales productivity. Meanwhile, Hambrick, Cho, and Chen (1996) found higher top management team tenure diversity associated with higher performance improvement, both in market share and profitability in a study among airlines. Besides performance, studies have also been directed at withdrawal behavior among top management team members. The following are reviews of empirical studies examining the relation between tenure diversity and turnover.

In a study among top management teams of firms listed on the Tokyo Stock Exchange, Wiersema and Bird (1993) examined the link between team tenure diversity and turnover. The firms were selected from four industries namely banking, consumer electronics manufacturing, food processing, and large retail sales. The participants were senior managers within a Japanese firm and serving as the key strategy formulating and decision-making body. Tenure diversity in the study was reflected as the coefficient of variation on length of time managers have worked together as a team or group. Turnover was measured by proportion of the top management team whom were no longer with the organization for the period of three years. The study found organizational tenure diversity was not a significant predictor of turnover among the top management team members. However, team tenure diversity was a significant predictor of turnover among top management team members less than 65 years of age. However, in a related study conducted by S. E. Jackson et al. (1991) among top management teams of bank holding companies, the results indicated that higher tenure diversity among top management teams will result in higher turnover among members. Researchers have also attempted to understand tenure diversity's effect in

relation to other work outcome namely creative behavior, communication frequency, innovation, strategic change, customer-oriented prosocial behavior, customer referrals, and organizational strategy. The next section will review the related literatures.

The influence of tenure diversity was also examined in relation to creative behavior by Choi (2007) among work units in a division of a large electronics company in Korea. The tenure diversity was measured using a unit level standard deviation of a given attribute. Creative behavior was measured by adapting items from prior scale measuring employee creative and innovation. In the study it was found that tenure diversity was not a significant predictor of creative behavior. Similar results was obtained by Zenger and Lawrence (1989), when examining the relationship between tenure diversity with communication frequency among research division project groups of a medium sized U.S electronics firm. On the same note Bantel and Jackson (1989) also found tenure diversity among top management teams was not significantly predicting innovation, neither technical innovation nor administrative innovation in a study among finance service industry. Similarly, in the study among large manufacturing firms resulted in tenure diversity among top management team did not significantly predict corporate strategy change (Wiersema & Bantel, 1992). Meanwhile, Pelled et al. (2000) found work units with higher tenure diversity to be associated with higher customer-oriented prosocial behavior among work units of a firm that manufactures, markets, and distributes nonalcoholic beverages. On the same note, Ely (2004) in the banking industry found

higher tenure diversity in branches to be an important resource for increasing customer referrals.

In summary tenure is found related to job performance at individual level of study. However, measuring tenure at team level it is necessary to measure the dispersion of tenure among members. The effects of tenure diversity have been examined in relation to team performance, organizational performance and other outcome measures. The findings of these studies have produced some inconsistent results.

4.4.2 Team Leadership and Team Performance

Almost every work team has a leader. They can be designated, from the team or outside the work team. Designated leaders are individuals identified by their titles such as departmental manager, supervisor, project leader or committee chair (Robbins, 1993). In some instances a team can have informal leaders known as emergent leaders. Schneider and Goktepe (1983) defined emergent leaders as team members who exert significant influence over other members of the team although no formal authority has been vested in them. Meanwhile external team leader is defined by Manz and Sims (1987) as leaders having a supervisory role but are not members of the team they lead. Internal leaders have a supervisory role and at the same time is a member of the team they lead. The effects of leadership have been examined in individual, team and organizational performance. The following are reviews of literatures pertaining to the relationship between leadership and individual performance.

A study by Rowold and Heinitz (2007) was conducted among employees in a large public transport company in Germany to demonstrate the relationship of leadership style and their effects on individual outcome. The study found leadership styles were significantly associated with individual outcome. However, Charbonneau, Barling, and Kelloway (2001) conducted a study to test a model in which leadership style affects sports performance. The study was conducted among 235 athletes and 16 coaches recruited among the varsity sports teams at one small university. Athletes were required to complete the questionnaire on transformational leadership and intrinsic motivation while the coaches provided the performance data for each athlete. The study found that leadership style did not predict the athlete's performance. Similarly, Madlock (2008) in a study examining the influence of supervisor leadership style on employee job and communication satisfaction found leadership style were not significant predictor of employee job and communication satisfaction. The contribution of leadership is not limited only to individual performance several studies have documented its influence on team performance.

In teams leaders are responsible in defining team directions and organizing the team to maximize progress, along such directions contributes significantly to team effectiveness (Zaccaro, Rittman, & Marks, 2001). In a study by O'Connell, Doverspike, and Cober (2002) conducted among 102 leaders from a large manufacturing plant examined the impact of internal leadership, by a designated leader, on semiautonomous work group performance. Each of the team leaders was in charge of one semiautonomous work group that was composed of from 4 to 13 team

members. Team leaders had to have been in that position with the current team for at least 6 consecutive months to be included in the study. For each of the 102 teams, two members were chosen at random to provide a subordinate rating of their leader's performance. To provide ratings of leadership, team members had to have been in their current team for at least 6 consecutive months. The instrument used to rate the leaders was a 21-item appraisal form covering seven dimensions of leadership performance consisting team leadership, teamwork, problem identification, problem solution, work standards, initiative, and safety. Items were rated using a 7-point Likert-type scale, and average or overall rating of leadership performance was calculated. Team performance were gathered through team member's perceptions (n=204), and managers (n=47) ratings of team performance with regard to productivity, quality, and overall performance using a 7-pint Likert-type rating scale. Both performance ratings for leaders and perceptions of work team performance were gathered from a random sampling. Results of the study indicated that the three measures of team performance as rated by managers to be not related with team leadership. However, the study found team leadership to be significantly related with team member ratings of productivity, quality, and overall performance. Meanwhile the findings of the study revealed that there was strong positive relationship between team leadership and manager-rated group performance for smaller teams (less than eight members). The study suggested that team size to be moderating the managers rating of self-directed work teams. In a related study Ammeter and Dukerich (2002) explored the factors affecting project team performance in a construction industry. The results of the study

found leader behavior to be a significant predictor of budget performance (cost growth). In addition the study also identified leader behavior to be a significant predictor of the perceptions of the overall project and team performance. In another study among a large unionized telephone company from four geographical regions S. G. Cohen, Chang, and Ledford (1997) performed a construct validity on the Self-Management Leadership Questionnaire (SMLQ). The results of the study identified self-managing leadership to be positively related to perceived work group effectiveness for both self-managing teams, and traditionally managed groups.

In addition to the internal leadership, the effects of external leadership on team performance were also examined. Kirkman and Rosen (1999) in a study among four organizations (two Fortune 50 organizations and two smaller companies) that had formally implemented work teams examined the relationship between leadership and team performance. The companies, all of which were located in the southeastern and southwestern United States, including two textile manufacturers, a high-technology manufacturer, and an insurance company. The external leader behavior group construct was measured with a 14-item scale. Examples of the items include the extent to which a leader agreed or disagreed that he/she gave team many responsibilities, asked the team for advice when making decisions, controlled much of the activity of the team (reverse-coded), allowed the team to set its own goals, stayed out of the way when the team worked on its performance problems, told the team to expect a lot from itself, and trusted the team. Team performance was measured based on team level productivity. It was assessed with a 6-item measure developed specifically for this study and

administered to the external leaders. The items represented a synthesis of the key performance indicators of each of the participating organizations. Examples include the extent to which respondents agreed or disagreed that their team met or exceeded its goals and completed its tasks on time. The results of the study indicated that external team leader behavior to be positively related with team-level productivity.

However, the study by Bass, Avolio, Jung and Berson (2003) examined how leadership style predicted performance in units operating under conditions of high levels of uncertainty, challenge and stress. A total of 72 platoons each made up of three rifle squads and a heavy weapon squad participated in the joint readiness training exercise. The findings of the study highlighted ratings of leadership style for the platoon sergeants were not significantly related to the platoon's performance. Similarly, Stashevky and Koslowsky (2006) conducted a study to examine the effects of leadership on team performance among graduate students and found effects of leadership style on the team performance were not significant. Meanwhile Lowe, Kroeck, and Sivasubramaniam (1996) conducted a meta analytic review of the literature which uses the leadership style and linked them to work unit effectiveness. The literature search yielded over 75 studies, of which 39 met the five criteria for inclusion. Results of the meta-analysis support the belief that leadership style is associated with work unit effectiveness. Finally, several studies documented the effects of leadership on organizational performance. The following are reviews on the relationship between leadership style and organizational performance.

The relationship between leadership style and organizational performance was examined by Agle, Nagarajan, Sonnenfeld, and Srinivasan (2006) among CEO and employees. The results indicate that leadership style is associated with perceived organizational performance and objective performance as measured by stock return, return of assets, and sales growth and but they found leadership style not associated with performance as measured by return on sales and return on equity. Similarly, Waldman, Javidan, and Varella (2004) conducted a study to examine the conditions under which leadership style may help yield positive firm performance among U.S. and Canadian firms. The study found leadership style significantly predicted organization performance as measured by net profit margin and return on equity but not to performance as measured by sales growth. Another sirnilar finding was obtained in the study among banks by Barling, Weber, and Kelloway (1996) where leadership style was found to be predicting sales. Unlike the other three studies, Waldman, Ramirez, House, and Puranam (2001) found no direct relationship between leadership style and organizational performance as measured by net profit margin. Similarly, Tosi, Misangyi, Fanelli, Waldman, and Yammarino (2004) found no direct relationship between leadership style and organizational performance whether assessed by return on assets or shareholder returns. In addition, Rowold and Heinitz (2007) found leadership styles were not correlated with profit. Meanwhile mixed results were obtained in the study by Ogbonna and Harris (2000) among medium and large sized firms. The study found leadership style was associated with organizational performance indirectly; specifically participative leadership in positive effect, however instrumental

leadership has negative effect. Similarly, Vigoda-Gadot (2007) in a study among public security division of a law enforcement agency in Israel found transformational leadership to be positively correlated to performance while transactional leadership to be negatively correlated with performance. In a similar vein, Yammarino and Bass (1990) in a study among United States Navy (USN) officers found transformational and transactional leadership to be positively with work outcomes while laissez-faire leadership work outcomes were negatively associated. On the same note, Geyer and Steyrer (1998) in a study among branch managers of Austrian banks found transformational leadership to be positively related to short term performance. However, the study also found transformational leadership to be negatively related to long term performance.

In summary leadership was examined at three different levels; individual, team, and organization. Leaderships were examined based on internal and external leaders. In all these three levels the relationship between leadership and performance produced some inconsistent results.

4.4.3 Team Roles and Team Performance

In teams, members are expected to play a set of expected behavior in a social unit known as roles (Robbins, 1993). Role is the typical behaviors expected that characterize a person in a social context (Biddle, 1979). Meanwhile Cook and Hunsaker (2001) defines role as an expected set of recurring behaviors that is expected from a member by others in the group. In summary we can conclude that roles are patterns of individual behavior

resulting from interaction with team members. Abilities and behaviors of team members are crucial for team performance and relevant to this are the roles that team member play.

Stewart, Fulmer, and Barrick (2005) conducted a study to examine the different methods of aggregation representing the formation of role structure. Participants of the study were 220 executive masters of business administration students organized into 45 teams. Team member roles were assessed via peer ratings on SYMLOG Adjective Rating Forms. The form contains groupings of behavioral descriptors and asks participants to rate how accurately the descriptors reflect their behavior of a target individual. Responses choices are "never", "rarely", "sometimes", "often", and "always". Task role measure is obtained from ratings of behaviors demonstrating "analytical", "task-oriented", and 'problem-solving" actions. The social measure is obtained from ratings of behavior demonstrating "cooperative", "friendly", and "equalitarian" actions. Ratings for individual team members were aggregated to form team-level constructs. Team level role amplitude was operationalized as the team-level mean of individual role ratings. Team-level role dispersion was operationalized as the variance of member role ratings within each team. Team level role bloc was captured by measuring the skew of the distribution of member roles within each team. Team outcomes were measured based on team cohesion and performance. Team cohesion was assessed with a 10-item measure. Items exemplars include "There's a feeling of group unity" and "Members of this group work together well". Individual team members provided ratings with the collective group as the target. Team performance was operationalized as the mean score of

instructor evaluation for two team projects. Results of the study indicated that task role amplitude, social role amplitude, task role dispersion, task role bloc, and social role bloc to be not related with team task performance. However the study found social role dispersion to be negatively related with team performance. In a related study, Senior (1997) conducted a study among 11 management teams to evaluate the Belbin's team role in predicting team performance. The study found that team role balance to be related with team performance.

The above are reviews of literature emphasizing on roles individual members play to achieve the team performance. However, there are certain attitudes and actual behavior consistent with a role, and this creates role identity (Robbins, 1993). The ability to shift roles rapidly takes place when it is recognized that the situation and its demand clearly requires major changes. As such, it can be expected that behavior of team members will be aligned with their role identity. A literature search has indicated that studies examining role identity and relating them to performance and other outcome measures are conducted at individual level. The following are reviews on role identity related studies.

Callero (1985) conducted a study among 658 blood donors of four permanent blood donation centers to help fill in the gap with an empirical investigation of role-identity salience as it applies to the specific act of regular voluntary blood donation. Role-identity salience referring to statements representing the extend to which the blood donor role-identity salience is part of the actor's self. Meanwhile, behavior was measured by the total number of blood donations made during the six-month period. Results indicated that

role identity salience is significant predictors of previous and future donations. Findings from this study supports that the role identity salience has independent effects on behavior. Based on the same study, Charng, Piliavin, and Callero (1988) later found that role person merger (role identity) was also strongly contributing to behavioral intention. In addition, Callero, Howard, and Piliavin (1987) using the same sample found that role-person-merger (role identity) positively and significantly predicts future acts of blood donation, independent of the effects of personal and social norms. This indicates that role-person-merger (role identity) predicts helping behavior independent of the effects of personal and social norms.

In an effort to replicate the above studies, L. Lee, Piliavin, and Call (1999) extended the investigation on whether this model also can be applied to the donation of time and money. The study was conducted a study among 1002 respondents based on the 1989 National Charity Survey. The path analysis indicates that the effect of role identity on intention is significantly for all three intentions (money/blood/time). In addition the effects in ranking order are greater for volunteering time, followed by blood donation and money donation. In a related study, Gargano, Nagy, and Rowe (2004) examined the predictors of organ donation among 129 individuals enrolled in various psychology classes in Philadelphia. However, the findings indicated that role identity did not significant predict neither organ donation intentions, frequency of volunteering, nor organ donation behavior.

Besides investigating the relationship between role identity and donation, there are several studies that linked role identity to other behavioral intentions namely green consumerism, voting choice, intentions to remain in

a university, and exotic dancing. For instance, Granberg and Holmberg (1990) conducted a study to examine the effects of prior behavior, self-identity, behavioral intention and behavior. The study was based on election studies in the United States and Sweden. In each of the U.S. and Sweden studies, a representative sample of adults was interviewed during the eight-week campaign period before the election and, whenever possible, after the election. Results of the study indicated that self-identity exerts a significant effect on behavior even when the effect of intention on behavior is controlled. When further investigated, self-identity exerted the strongest direct effect on behavior, followed by intentions and prior behavior among strong party identifiers. Meanwhile, Sparks and Shepherd (1992) conducted a study to examine the relationship between self-identity and behavioral intentions of eating organic vegetables among general public in central England. The findings of the study indicated that self identity had a significant effect on whichever measure of attitudes and intentions. Whereas, in a related study Biddle, Bank, and Slavings (1987) examined the effects of undergraduates' norms, preferences and self-referent identity labels on their decisions to remain at or to leave the institution of higher education in which they were then enrolled. The study found role identity had independent significant effects on intentions not to lay out of university, intentions to seek a career that requires college education, and intentions to remain at that particular university. Finally, D. E. Benson, Epstein, and Reid (1994) conducted a study among exotic dancers from strip clubs to understand the identity consequences of occupying the socially deprecated role and how these are related to both perceived and actual behavior in the role. It was found that

role identity was a significant predictor of how much time the dancers perceive they spend in the role (perceived behavior). However, role identity was not found to be a significant predictor of number of hours spent dancing (behavior) and expectations for time spent dancing in the future (behavior intention).

In summary team member roles revealed mixed results when associated with team performance. In some instances team role helps to predict team performance, at the same time team role is also found to be not related to team performance. Similarly role identity also produced some inconsistence results on the relationship with performance namely behavioral intention and actual behavior.

4.4.4 Team Norms and Team Performance

Teams establish norms; an acceptable standards of behavior that are shared by the team's member. According to Hackman (1992) norms are defined as generally agreed upon informal rules that guide member's behavior. Meanwhile Jones (1997) defines norms as standards or styles of behavior that are considered acceptable or typical for a group of people. In summary norms is an informal rule that teams adopt that regulates members' behavior. There is general agreement that norms are structure rather than process because the main function is to regulate and regularize member behavior (Hackman, 1992). Team norms can play a large role in determining whether the team will be productive or not (Feldman, 1984). Understanding team norms can help the team to develop more effective behavior patterns.

Amundson (2005) in a study examined the role of group emotional competence (i.e. group interactions, relational norms) and its impact on the team effectiveness among health care and health service teams. A convenience sampling was used to gather the sample, consisting of 20 interdisciplinary teams and their team supervisors. Two assessment tools were used namely the Group Emotional Intelligence Questionnaire and 2 ratings scales of team effectiveness (member version and supervisor version). Each relational norm of the group emotional competence model represented a subscale on the questionnaire. Of the 66-item questionnaire, 4 subscales comprised the individual interaction level, 4 others subscales comprised the group interaction level, and 3 more subscales comprised the cross-group interaction level. Respondents were asked to rate the degree of agreement with the statement on a 7-point Likert scale with "1" being "completely disagree" to "7" being "completely agree". An example of positively stated item was "In our group, we often discuss what is helping and hurting our performance". The Team Effectiveness Scale developed for this study was a hybrid of effectiveness determinants. The 2 rating scales of team effectiveness, the member version and the supervisor version both included team performance indicators (e.g. team efficiency). A 7 point Likert scale was used to rate each team effectiveness criterion. The results of the study revealed that a team adopting certain relational norms would demonstrate higher performance within its organization. In another study among MBA students at a major American university Chatman and Flynn (2001) examined the effects of norm on team effectiveness and efficiency. The results of the study found that norm to be related to team effectiveness and

efficiency. However, in a study by Ng and Dyne (2005) among undergraduate student groups, the result revealed that norm not to be related with group performance. Several studies also examined the influence of norm on organizational performance in particular to marketing related disciplines.

For instance, Cai and Yang (2008) conducted a study to understand the impact of norm on supplier performance and buyer satisfaction among manufacturing organizations in China. The study revealed that norm significantly, affected supplier's performance and did not affect buyer satisfaction. Similarly, Langerak (2001) found customer's and supplier's norm with manufacturer influences the manufacturer's financial performance. Unlike the other two studies, Siguaw, Simpson, and Baker (1998) in a study among supplier-distributor dyads found mixed results where norm were positively related positively to commitment but inversely related to satisfaction with financial performance. However, Heide and John (1992) in a study conducted to understand the effects of norm, and buyer concentration on buyer control among buyers and suppliers found norm does not significantly predict buyer control. Norm was also examined with other work outcomes. In a study by Kasouf, Celuch, and Bantham (2006), conducted to explain individual-level communication factors that affect relationship quality and, consequently, relationship success or failure. The study found norm to be a significant predictor of self-efficacy.

Meanwhile, other specific norms were also examined in relation to group performance. In a study among 48 project groups in four sections of an advanced undergraduate management courses at a Northeastern university in the United States, Janicik and Bartel (2003) examined the effects of

temporal planning (inclusive of time awareness norms) undertaken at the beginning of a task on successful performance in groups. Each section instructor randomly assigned his/her students to permanent project groups of four to five members that completed an organizational consulting project. Time awareness norms were measured based on the degree to which groups developed time awareness norms with 13 items. Course instructors provided performance ratings based on project group's written reports. To determine project group's overall performance, course instructors responded to a single item measure from Set of Methods for Research on Work Teams. Instructors evaluated each group using a 7-point scale (1= report is far below specified quality standards, 7= report greatly exceeds specified quality standards). The results of the study indicated that time awareness norms to be related to the group task performance. In another instance, Gellatly (1995) conducted a study to test a causal model of absence behavior among 166 nursing and food services employees of a mid-size chronic care hospital in central Canada. The study found perceived absence norm to be positively related to both group level absence measure (absence frequency and total days absent).

The effects of norm were also associated with work outcomes. In a study among 186 full-time employees of a computer software firm based in southwest United States, C. L. Jackson, Colquitt, Wesson, and Zapata-Phelan (2006) aimed to validate a new measure of collectivism for use in work contexts and link the scores on that measure to group member performance. Participants worked in groups (programmer, software support, and client support) that were highly interdependent, requiring cooperation to

meet the specific needs of their clients. All measures were assessed using a 5-point Likert scale with anchors 1 (strongly disagree) to 5 (strongly agree). The 15 item measure of collectivism inclusive of norm acceptance was adapted from previous studies. Task performance was supervisor rated employee performance using the 7-item, with the wording changed to reflect duties and responsibilities. Citizenship behavior was also supervisor rated using the 16-item measure, with the wording changed to reflect work group directed citizenship. Counterproductive behavior was also supervisor rated using the 9-item scale, with the wording changed to assess work group directed counterproductive behaviors. Withdrawal behavior was also supervisor rated with 10-item, with the wording changed to reflect the work group context and was also altered to allow for supervisor-reported rather than self-reported data. The results of the study indicated that norm acceptance to be an important predictor of counterproductive behavior and, to a lesser extent, withdrawal behavior.

In summary norms have been investigated in various perspective at individual, team and organizational level. The above review of literatures shows reveals inconsistency results on the relationship between norm and performance.

4.5 POSSIBLE MODERATOR

In general a moderator is an objective or subjective variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny, 1986).

Understanding the moderating effects on the relationship between team characteristic and team performance is important. In team performance related studies, several moderating variables were examined such as task type, team potency, and size of a team (e.g. Gil, Rico, Alcover, & Barrasa, 2005; Gladstein, 1984; O'Connell et al., 2002; Stewart & Barrick, 2000). However, in the Hackman's (1987) normative model of group effectiveness, group synergy had been proposed as the moderating variable. Group synergy varies from positive to negative synergy. Positive synergy refers to when the synergistic gain from group interaction exceed group losses, meanwhile negative synergy is when group losses exceed synergistic gains. Based on the Hackman's (1987) point of view cohesiveness can posit positive synergy depending on how well group goals match the task goal (Gibson, Ivancevich, & Donnelly, 1994; Nahavandi & Malekzadeh, 1999). Synergistic gains through highly cohesive team are members become more active participants in the team, and level of communication within the group increases (George & Jones, 2002).

The word cohesiveness derived from the Latin word *cohaesus* meaning " to cleave or stick together" (Dion, 2000). Meanwhile, Festinger (1950) defines cohesiveness as "the resultant of forces which acting on members to remain in the group". On the same note O'Reilly, Caldwell, and Barnett (1989) defined cohesiveness as an essential component of the group's overall social integration, or the attraction to the group, satisfaction with other members of the group, and social interaction among the group members. Cohesion thus, reflects synergy through members' interaction. In the present study the group synergy examined is the team cohesiveness.

The construct of cohesiveness has been subject of a great deal of research in the teams' domain (Barrick et al., 1998; Bettenhausen, 1991; Mullen & Copper, 1994; Podsakoff, MacKenzie, & Ahearne, 1997; Stashevsky & Koslowsky, 2006). Much of the studies in cohesiveness involve where the concept or ideas of "togetherness" is particularly relevant.

Reviews of the team literature have reported a lack of consensus regarding the magnitude, direction, or even existence of a relationship between team structure variables and performance. Previous studies that examined the relationship between team structure variables comprising of age diversity (e.g. Ely, 2004; Kang et al., 2006; Kirkman et al., 2004; Richard & Shelor, 2002; Simons et al., 1999; Wagner et al., 1984), tenure diversity (e.g. Ancona & Caldwell, 1992; Bantel & Jackson, 1989; Carpenter, 2002; Hambrick et al., 1996; Reagans & Zuckerman, 2001; Zenger & Lawrence, 1989), leadership, (e.g. Ammeter & Dukerich, 2002; Bass et al., 2003; S. G. Cohen et al., 1997; Kirkman & Rosen, 1999; O'Connell et al., 2002) roles (e.g. D. E. Benson et al., 1994; Callero et al., 1987; Charng et al., 1988; Granberg & Holmberg, 1990; Senior, 1997; Stewart et al., 2005), and norms (e.g. Cai & Yang, 2008; Chatman & Flynn, 2001; C. L. Jackson et al., 2006; Ng & Dyne, 2005; Siguaw et al., 1998) and performance or other related outcomes produced some inconsistent results. Such inconsistent findings could be further understood with the introduction of a moderator variable. According to Baron and Kenny (1986), moderators are often introduced when the relationship between predictor and outcome is unexpectedly weak or inconsistent.

In this study cohesiveness is introduced as a moderator variable in order to examine the form and/or magnitude of the relationship between team structure variables and initial emergency response performance (Sharma, Durand, & Gur-arie, 1981). Studies in the past have examined the moderating effects of cohesiveness on the relationship between between task difficulty and individual performance (Dailey, 1978), initiation structure and satisfaction with supervisor (Schriesheim, 1980), role ambiguity with self-esteem and job satisfaction (Beehr, 1976), leaders behavior and subordinate satisfaction (Dobbins & Zaccaro, 1986), and leadership and perceptions of performance and commitment (Pillai & Williams, 2004). These investigations further serve as a foundation for the research framework.

For instance, the study conducted by Dailey (1978) conducted a study to investigate how member perceptions of facet of group cohesiveness moderate the relationships between task characteristics (difficulty and variability) and individual performance. The study was conducted among 961 scientist and engineers representing public and private R&D organizations. The study found that cohesiveness facets moderated the relationship between task difficulty and individual performance. However, the relationship between task variability and individual performance was not moderated by cohesiveness. Meanwhile, in another study Beehr (1976) investigated group cohesiveness as a moderator of the relationship between role stress and role strain. The investigation took place among 651 individuals employed by five midwestern work organizations in the United States. The study revealed that group cohesiveness moderated the relationship between role ambiguity-low self-esteem and role ambiguity-job dissatisfaction.

Cohesiveness has also been examined as a moderator on the relationship between leader behavior and satisfaction. For example, Schriesheim (1980) conducted a study to investigate the role of group cohesiveness as a moderator of relationships within the leader-subordinate relationships. The sample of the study was 308 low and middle level managerial and clerical employees in 43 work groups within a public utility. As predicted, the study found cohesiveness to moderate the relationship between initiating structure and subordinate satisfaction with supervision. The study further found cohesiveness to negatively moderate the relationship leader initiating structure and subordinate role clarity. In addition, cohesiveness was found to be positively moderating the relationship between leader consideration with subordinate role clarity, and with self-rated performance. However, the relationship between leader initiating structure and self-rated performance was not moderated by group cohesiveness. Similarly, Dobbins & Zaccaro (1986) examined the moderating effects of cohesiveness on the relationship between leader behavior and subordinate satisfaction in a military organization. The study found group cohesiveness to be moderating the relationship between leader behavior and subordinate satisfaction. Specifically, cohesiveness moderated the relationship between leader initiating structure and subordinate's satisfaction with the organization. In addition, cohesiveness also moderated the relationship between leader consideration and subordinate's satisfaction with coworkers, satisfaction with work, and satisfaction with the organization. Another similar attempt to understand the moderator effect of cohesiveness on the relationship between leadership and perceptions of unit performance and commitment was

conducted among fire rescue employees, however, the study did not find a significant interaction effect (Pillai & Williams, 2004).

Based on the above discussion and the review of previous studies, it is reasonable to view team cohesiveness as a moderator of the relationship between team structure, and team performance among emergency responders. Moreover, in a review by Bowers et al. (1996) it was mentioned that moderators at the group level derive their effects from some group influence or interaction. While O'Reilly et al. (1989) defined cohesiveness as an essential component of the group's social interaction among the group members, cohesiveness can be postulated as a possible moderator. Therefore, the proposed study will examine cohesiveness as a moderator on the relationship between team structure, and team performance among emergency responders.

4.6 SUMMARY

The review of the literature does indicate that team member resources and team structure does influence team performance. The previous studies have demonstrated that physical ability, personality, team demography, leadership, roles, and norms have influenced team performance. However, the team structure variables comprising of team demography, leadership, roles, and norms have yielded some inconsistent results. Some studies have indicated these factors influencing team performance whereas other studies have indicated no influence on team performance. This study will attempt to determine to what extent team member resources and team structure

influences initial emergency response performance. It is noted from the literature previous researchers have not paid attention on the influence of cohesiveness in the relationship between team structure and team performance. This study will incorporate cohesiveness as a moderating variable in the model. Previous scholars have examined cohesiveness as a moderator in relation to individual level outcome and not team level outcome. As such, in the present study cohesiveness will be examined as a moderator of the relationship between team structure, and team performance among fire fighters.

CHAPTER FIVE

METHODOLOGY

5.1 INTRODUCTION

The previous chapter has discussed related literature on emergency response and team characteristics. This chapter covers the research methodology and procedure undertaken by this study. This includes theoretical framework, underpinning theory, data collection, research instruments, population, sample, sampling technique, and data analysis.

5.2 THEORETICAL FRAMEWORK

Review on team literature indicates that team determinants could be expected to explain initial emergency response performance. Studies by Rhea et al. (2004) and Williford et al. (1999) have suggested that task abilities are related to performance. Even though the relationship was examined at an individual level by previous researchers, the current study will aggregate the individual response to represent team-level constructs. Secondly, Barrick et al. (1998), Halfhill et al. (2005), Morgeson et al. (2005), Neuman et al. (1999), and Neuman and Wright (1999) found team personality to be related with team performance.

In addition to member resources, team structural determinants namely team demography comprising age and tenure dispersion in teams are also found to be related to team performance (Ely, 2004; Pelled et al., 1999; Timmerman, 2000) and work outcomes (Wiersema & Bird, 1993). In addition, leadership (Ammeter & Dukerich, 2002; S. G. Cohen et al., 1997; Kirkman & Rosen, 1999; O'Connell et al., 2002), roles (Senior, 1997; Stewart & Barrick, 2000), and norms (Amundson, 2005; Chatman & Flynn, 2001; Janicik & Bartel, 2003) are also found to be related to team performance.

Finally the present study attempts to investigate the moderating effects of cohesiveness on team performance. Previous studies have found cohesiveness to moderate the relationship between task difficulty and individual performance (Dailey, 1978), and initiation structure and satisfaction with supervisor (Schriesheim, 1980). In addition cohesiveness is also found to moderate the role ambiguity relationship to self-esteem and job satisfaction (Beehr, 1976). Similarly Dobbins and Zaccaro (1986) found cohesiveness to moderate the relationship between leaders behavior and subordinate satisfaction. However, the present study examines cohesiveness as a moderator of the relationship between team structure, and initial emergency team performance. These empirical evidences serve as a foundation for the research framework.

A model illustrating the relationships between team member resources, team structure, and initial emergency response is presented schematically in Figure 5.1. The figure presents an overview of the model to be tested in this study. The first independent variable of the present study is team member resources comprising two factors namely team member ability,

and team member personality. Meanwhile, the second independent variable of the present study is team structure dimensions, which include team demography (age and tenure), leadership, roles, and norms. Initial emergency response performance is the dependent variable of the present study. It is also hypothesized that team cohesiveness will moderate the relationship between team structure, and initial emergency response. The research model is developed based on Robbins (1993) group behavior model which was substantially based on the work of Bushe and Johnson (1989), Goodman et al. (1987), and Hackman (1987) as shown in Figure 5.1. Each variable included in the model is conceptually defined in the following page.

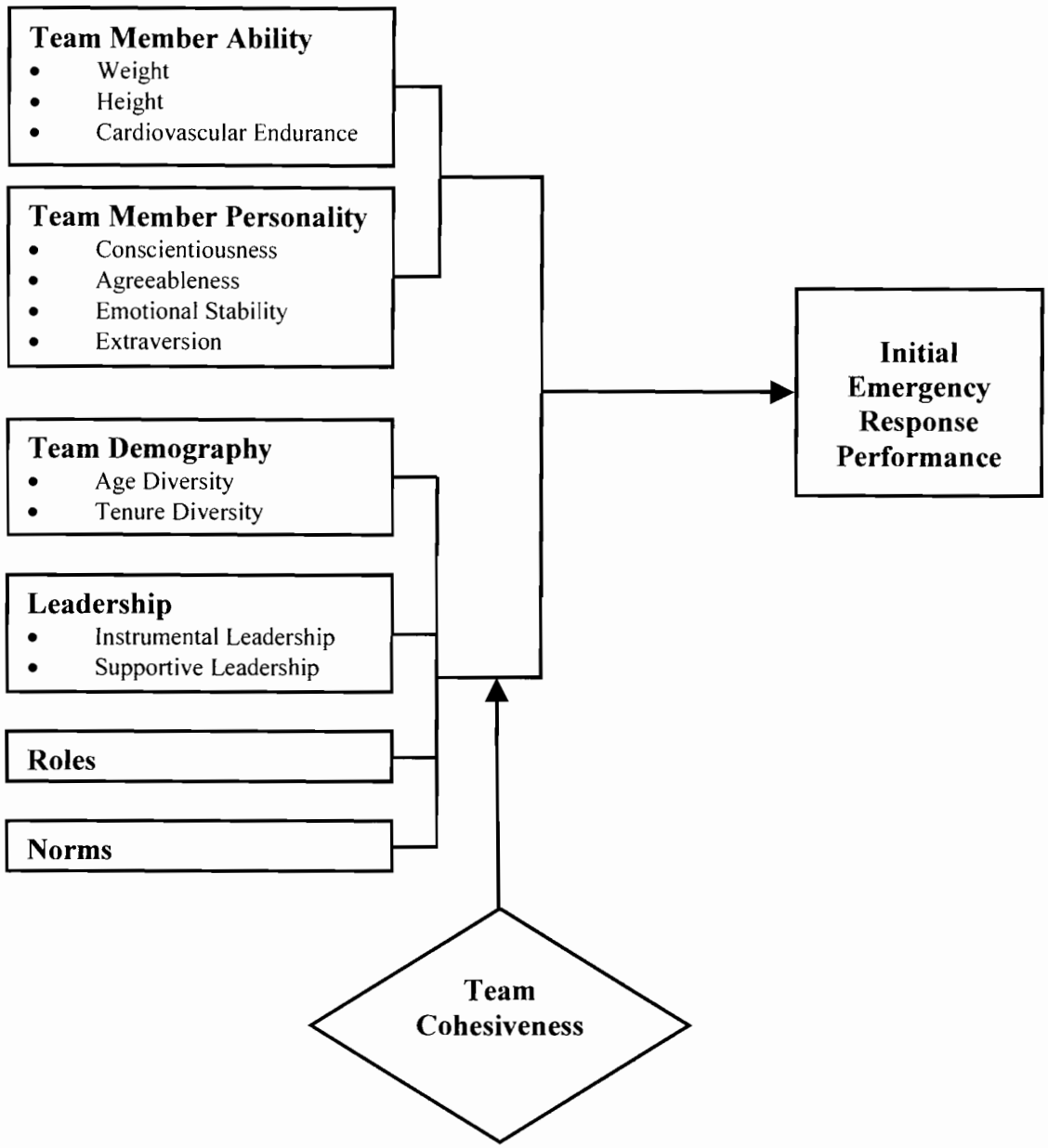

Figure 5.1. Research model

5.3 UNDERPINNING THEORY

There are many theories that explain how teams perform such as Homans' theory, sociotechnical theory, and field theory. Homans' theory depicts teams as social systems made up by external and the internal subsystems. Both the

subsystems influence each other and explain how team behaves. The core idea of sociotechical theory is that any team contains technical and social systems. The technical subsystem defines the task to be accomplished and the social subsystem defines how the tasks are to be performed. When these two systems achieve consonance, the team is expected to perform better.

In the Robbin's (1993) group behavior model it is depicted that team member's contribution and the team's internal structure explains the overall team behavior. This relationship is best explained using the field theory. The field theory is a contribution from a psychologist named Kurt Lewin who immigrated to the United States from Germany in the 1930s. Kurt Lewin's (1890-1947) work had a profound impact on social psychology particularly on group dynamics. Lewin is widely viewed as the "father" of small groups research (Forsyth, 1990). His empirical and theoretical efforts were instrumental in sparking widespread interest in group dynamics. Born in Poland in 1890, Lewin studied and taught in Berlin before moving to United States in 1933. He taught in Cornell University, University of Iowa, and Massachusetts Institute of Technology. During his tenure at Child Welfare Station at the University of Iowa he refined *field theory*, his psychological theory of human behavior. In 1945, he established the Research Centre for Group Dynamics at Massachusetts Institute of Technology. At this centre, which was later moved to the Institute for Social Research at the University of Michigan, Lewin conducted studies on consequences of interdependence among group members. Although he died unexpectedly of heart attack, his students and colleagues continue to carry on the Lewinian tradition in their theory, research, and application (Lippitt, 1947).

5.3.1 Lewin's Field Theory

Kurt Lewin's field theory demonstrated that human behavior is the product not simply of personal characteristics, instincts, and other forces within us but also of complex, dynamic environment the individual inhabit. Lewin developed field theory around the idea that individual occupy a "life space" that comprises both internal and external factors, including other people. The whole psychological field or "lifespace" within which the individuals are experiencing must be viewed, in order to understand the overall behavior. Individuals are participating in various lifespaces in their daily life such as the family, work, school, friends, etc. In the field theory, "field" is defined as "the totality of coexisting facts which are conceived of as mutually interdependent" (Lewin, 1951, p. 240). All of the events such as the desire, thinking, decision making, responding and etc are conceived to be a function of the lifespace, which consist of the individual and the environment viewed as one constellation of interdependent factors (Riordan & Riordan, 1993).

Relevant to team dynamics, Lewin (1958) postulated that team behavior is a complicated set of interactions and forces that not only affect team structures, but also modify individual behavior. Teams have their own life and that they can influence members of the team, and vice versa. In other words the team behavior must be considered to be a function of both the personal characteristics of the individual and the characteristics of the environment. The field theory summarized with the, formula $B = f(P, E)$ (Argyris, 1952; Lewin, 1951). In the equation the person (P) and the person's environment (E) have to be viewed as variables, which are mutually

dependent upon each other. According to Lewin (1951) the person and the person's environment has to be considered as one constellation of interdependent factors to predict and understand the group behavior(B).

The field theory has influenced the work of others by shaping the way in which groups and teams are studied. Besides that, the field theory assisted a large network of researchers to study a wide variety of group and team phenomena (Moreland, 1996). However, the drawback of field theory is it focuses more on practical rather than theoretical in nature. The key feature of field theory was the concept of "lifespace" or psychological field. A person's life space contains of all social and nonsocial forces that are influencing his or her behavior. These forces can only be identified by seeing the world through the person's eyes (Moreland, 1996). Thus the life space is subjective rather than objective. This had two consequences for social psychology.

First, it broadened the laboratory work enormously, allowing researchers to study almost any phenomenon. Studies were experimental rather than mundane realism. The apparent ability to study almost any group phenomenon in the laboratory, combined with the relative ease of laboratory work versus fieldwork, made laboratory experiments very popular with researchers (Moreland, 1996). In a review by Moreland, Hogg, and Hains (1994) showed more than 75% of the social psychology research on groups involved laboratory experiments. This raises doubts on the external validity of the findings when the laboratory experiments are far removed from the real-world analogues (Moreland, 1996). Secondly, the field theory refocused the social psychological research on the individual. The life space in the field theory consists of primarily of internal representation namely individual

thoughts, feelings and so on. In such instance it is argued to be wiser to study them directly, rather than their consequences on the group outcomes.

However, field theory is an appropriate theory to unveil a group phenomenon using a fieldwork research design among natural groups. In addition the internal representation issues can be resolved by aggregating the individual responses to represent the group response in understanding a group phenomenon. Moreover, present studies still uphold the tradition of field theory within group research (e.g. Bales, 1999; Bales & Cohen, 1979) and recognized as one of the many competing social psychological theories in the study of group behavior (Shaw, 1981).

5.4 CONCEPTUAL DEFINITION OF VARIABLES

5.4.1 Dependent Variable

The dependent variable in the present study is emergency response performance. Emergency response performance refers to the team member's performance in responding to an emergency situation. The performance of the teams will be assessed based on responses to emergency incidences. The assessment is on the team's outcome and not the individual's in the team. In the present study the performance of emergency response comprises all types of emergencies that require the services of an emergency response team.

However, the present study will only look into the initial emergency response performance. This is to avoid the uncontrollable situational factors

that may influence the findings of this study. The weather condition, during the emergency response period, the road traffic condition, access to the emergency incident scene, prior knowledge on the emergency incident location and etc are some of the uncontrollable situational factors examples. These uncontrollable factors are deemed for play an important part in determining the emergency response performance. Ineffectiveness and inefficiency of an emergency response performance cause by these uncontrollable factors should not be rested solely on the responding teams. It's unfair for perceive that the response was poor when these contributing factors are known to be uncontrollable. Thus, in the present study the initial emergency response refers to performance of the team in responding to an emergency from receiving a distress call until the team leaves from the standby point. The measures emergency response performance was adapted from previous studies by Al-Ghamdi (2002), Altintas and Bilir (2001) Fitzsimmons (1973), O'Meara (2005), Pons and Markovchick (2002), and Pons et al. (2005).

5.4.2 Independent Variable

The independent variables of the present study are team member resources and team structure. The member resources variables in this study are ability and personality. It is well known that emergency responders perform jobs that are physically strenuous. In the present study the ability of emergency responders refers to the ability to perform physical demanding activities (Sothmann et al., 1990). Intuitively, high level of physical fitness will aid the

emergency responders to perform their job better (Williford et al., 1999). Meanwhile the second variable of team member resources is team personality, which refers to the mix of team member's individual traits (Barrick et al., 1998).

Team structure variables in this study are team demography (age and tenure) leadership, roles, and norms. The first variable of the team structure is team demography consisting of age and tenure, which refers to the degree to which a team is heterogeneous with respect to age and tenure (Pelled et al., 1999). Leadership refers to adoption of a leadership style to deal with team members (Ogbonna & Harris, 2000) and in specific, the leader's demonstration of task and relational oriented behavior. Leadership in this study, which is composed of task and relational behavior, is conceptualized as styles approach to leadership. Team roles are defined as patterns of individual behavior resulting from interaction with other team members (Stewart et al., 2005). The final variable is norms which refers to the behavior patterns that are relatively stable and expected by group members (Bettenhausen & Murnighan, 1991).

5.4.3 Moderating Variable

Cohesiveness is defined as the the resultant of forces which acting on members to remain in the group (Festinger, 1950). It is an essential component of the team's overall social integration, or the attraction to the team, satisfaction with other members of the team, and social interaction among the team members (O'Reilly et al., 1989). Previous studies relating

team structure namely age diversity (e.g. Ely, 2004; Kang et al., 2006; Kirkman et al., 2004; Richard & Shelor, 2002; Simons et al., 1999; Wagner et al., 1984), tenure diversity (e.g. Ancona & Caldwell, 1992; Bantel & Jackson, 1989; Carpenter, 2002; Hambrick et al., 1996; Reagans & Zuckerman, 2001; Zenger & Lawrence, 1989), leadership, (e.g. Ammeter & Dukerich, 2002; Bass et al., 2003; S. G. Cohen et al., 1997; Kirkman & Rosen, 1999; O'Connell et al., 2002) roles (e.g. Callero et al., 1987; Charng et al., 1988; Granberg & Holmberg, 1990; Senior, 1997; Stewart et al., 2005), and norms (e.g. Cai & Yang, 2008; Chatman & Flynn, 2001; C. L. Jackson et al., 2006; Ng & Dyne, 2005; Siguaw et al., 1998) to performance and other related outcomes have produced some inconsistent results. This condition permits the introduction of a third variable known as the moderator variable. Moderators are often introduced when the relationship between predictor and outcome is unexpectedly weak or inconsistent (Baron & Kenny, 1986).

In this study cohesiveness is introduced as a moderator variable in order to examine the form and/or magnitude of the relationship between team structure variables and initial emergency response performance (Sharma et al., 1981). Previous studies have investigated cohesiveness as a moderating variable. For example, Dailey (1978) assessed the moderating effect of perceived cohesiveness on the task characteristics and individual performance relationship. The moderating effect of group cohesiveness was also examined on the relationship between leader behavior and subordinate role clarity, satisfaction with leader and self-rated performance (Schriesheim, 1980) and job satisfaction (Dobbins & Zaccaro, 1986). In addition the moderating effects of cohesiveness on the relationship between

organizational stress and individual strain was also examined (Beehr, 1976). In the present study, the effects of team perceived cohesiveness will be examined on the relationship between team structure, and initial emergency response performance. Having discussed the study variables, the next section explains the measurement of these variables.

5.5 STATEMENT OF HYPOTHESIS

Drawing upon the literature review presented in the previous chapter and the theoretical justification above, hypotheses have been formulated, which are to be tested in this study. With the exception to the hypotheses that concerns the moderating effects, each main effect hypotheses are stated in the form of an alternate hypothesis. Based on previous studies as well as taking the perspective of field theory, the following hypotheses are advanced for this study.

5.5.1 Main Effect

The following six hypotheses are concerned with the relationship of team member resources, and team structure on initial emergency response performance.

H1: Team ability is related to initial emergency response performance.

H1a: Team weight is positively related to initial emergency response performance.

H1b: Team height is negatively related to initial emergency response performance.

H1c: Team cardiovascular endurance is negatively related to initial emergency response performance.

H2: Team personality is related to initial emergency response performance.

H2a: Team conscientiousness is negatively related to initial emergency response performance.

H2b: Team agreeableness is negatively related to initial emergency response performance.

H2c: Team emotional stability is negatively related to initial emergency response performance.

H2d: Team extraversion is positively related to initial emergency response performance.

H3: Team demography is related to initial emergency response performance.

H3a: Team age diversity is positively related to initial emergency response performance.

H3b: Team tenure diversity is negatively related to initial emergency response performance.

H4: Team leadership is related to initial emergency response performance.

H4a: Team supportive leadership is negatively related to initial emergency response performance.

H4b: Team instrumental leadership is negatively related to initial emergency response performance.

H5 Team role is negatively related to initial emergency response performance.

H6: Team norm is negatively related to initial emergency response performance.

5.5.2 Interacting Effect

Even though this study managed to support the relationship between the moderator and team structure variables, it should be noted that the role of cohesiveness as moderators of the relationship between team structure and initial emergency response has never been previously explored. Therefore, in the present study the possible interacting effects of cohesiveness with team structure variables should be considered exploratory. In such condition where relationships have never been previously explored, a non-directional hypothesis should be formulated (Sekaran, 2003). The following non-directional hypothesis are thus advanced in the in this study.

H7: Cohesiveness moderates the relationship between team structure and initial emergency response performance.

H7a: Cohesiveness moderates the relationship between team demography and initial emergency response performance.

H7a1: Cohesiveness moderates the relationship between age and initial emergency response performance.

H7a2: Cohesiveness moderates the relationship between tenure and initial emergency response performance.

H7b: Cohesiveness moderates the relationship between leadership and initial emergency response performance.

H7b1: Cohesiveness moderates the relationship between supportive leadership and initial emergency response performance.

H7b2: Cohesiveness moderates the relationship between instrumental leadership and initial emergency response performance.

H7c: Cohesiveness moderates the relationship between roles and initial emergency response performance.

H7d: Cohesiveness moderates the relationship between norms and initial emergency response performance.

5.6 OPERATIONALIZATION OF THE VARIABLES

Responses regarding team member resources and team structure were obtained from team members. Meanwhile the emergency response performance was gathered from the records in respective fire station, which is the "Occurrence Book". The book is used to record various daily activities performed in the fire station namely team member attendance, daily job description performed inside and outside the station, details of visitor to the fire station, details of the person in-charge of the recording information into the book, station's vehicular movement, and etc. In a case of emergency occurrence details of the caller identity, time received call, time alarm activation, time fire engine leaving the station, time of reaching the scene, time of the first extinguishing effort, time operation was called off, time

leaving the emergency scene, time reaching back to the station, and name of the commanding officer will be furnished in the book.

In addition, team members were also asked to provide information on the demographic factors. Questionnaires in Malay were provided to team members with instructions to complete the questionnaires.

5.6.1 Initial Emergency Response Performance

Initial emergency response performance in the present study was used as an indicator of overall team performance. The team was assessed based on their response time to emergency incidents. Response time is the appropriate indicator to evaluate the accessibility of emergency responders; it is an essential factor in victim's survival or property damage, or there would be no sense of emergency in responding to an incident (Al-Ghamdi, 2002). In an emergency incidence, the teams have to respond with a sense of urgency. Prior to an incident the team members will be on standby at the waiting room in their respective fire stations. Upon receiving an emergency call, the team members will be alerted by an alarm bell that rings for 30 seconds. Team members will then need to quickly dress up in their appropriate attire and rush onto the fire truck. It is a standard procedure that the time of call, the time of alarm bell ring activation, the time of alarm bell ring deactivation, and the time of fire truck leaving the stations are recorded. In addition, the time members reach the scene, they gather for instruction from the team leader and the incident is successfully mitigated are also recorded. A sample of recorded time for each component is presented in

Table 5.1. All these recorded times served as a performance measure in emergency response studies undertaken by Fitzsimmons (1973), Altintas and Bilir (2001), Al-Ghamdi (2002), and Pons et al. (2005).

Table 5.1

Sample of Recorded Response Time Component

Time of call received (A)	**Time of alarm activation (B)**	**Time of alarm deactivation (C)**	**Time of fire truck leaving the station (D)**	**Time taken to leave station (D-C) (in seconds)**
21:45:00	21:45:30	21:46:00	21:46:21	21
16:11:00	16:11:30	16:12:00	16:12:40	40
12:03:00	12:03:30	12:04:00	12:04:30	30
20:38:00	20:38:30	20:39:00	20:39:50	50
21:32:00	21:32:30	21:33:00	21:33:25	25

Source: Fire and Rescue Department Malaysia (FRDM)

Despite the various response time components, only the initial response time was used as the performance measure in the present study. The initial response time is the difference between the time of call received (A) and the time of fire truck leaving the station (D), as specified in Table 5.1. In line with the guidelines set by the Fire and Rescue Department of Malaysia (FRDM), the time of fire truck leaving the station (D) is measured at the initial movement of the fire engine from its static position. The initial response time is an important indicator of performance as it has been stressed that the first few seconds in emergency is vital (Baldwin, 1994). In addition, Landy and Farr (1983), stressed that performance measurement is an index of output or production. Similarly, the time taken to respond by the fire fighting teams is a form of work output and therefore, the initial emergency response time clearly

is a form of performance measurement. Furthermore, performance measured through the time taken in the initial response which measures from the time of call received is similar to the previous studies in the field of emergency response (Al-Ghamdi, 2002; Altintas & Bilir, 2001; Fitzsimmons, 1973; Pons et al., 2005). Thus, the time taken in the initial response clearly indicates and serves as the team performance measure and the interval time in the present study was recorded in seconds.

The initial emergency response time taken also took into account the distance traveled by emergency responders (i.e. from the waiting room to the fire truck). In other words the index of performance in the present study is being measured as time taken to travel over a distance (seconds/meter). Controlling the distance will give meaningful performance data as distance traveled in each station varies.

In the present study a customized form was developed to record the time components and the time taken in the initial emergency response. This form was used at each selected fire station in the study. The initial emergency response time for the present study only accounted fire and road accidents incidents because they need responses using fire engines; other incidents such as responding for a snake or venomous animal threat are usually responded using vans or a four wheel drive vehicle. The entire team will be involved in cases where the fire engine is used to respond while responses using vans or four wheel drive vehicles would only require two to three members of the team. The design of the present study was to understand team performance therefore the study included only responses that involved the entire team members. Furthermore, cases that are

responded by vans or four wheel drive vehicles usually would not require urgency in responding.

The data for initial response time was collected for the duration of five months from April 2007 to August 2007, in line with the time taken to collect the predictor variable data. In addition to that, the researcher measured the distance from the waiting room to the fire truck in each selected fire station. The distance was weighted to the initial emergency response to give a meaningful performance indicator. The criterion variable was measured by time taken per meter for each response and later averaged based on the frequency of cases. The average weighted initial emergency response time was then averaged over the five months period; averaging served to smooth any potential aberrations associated with a single month's or incident's weighted initial emergency response performance (Carpenter, 2002).

In summary the performance of initial emergency response was measured based on the time interval from the emergency call received to the time of initial movement of the fire engine from the static position at the fire engine bay and adjusted for the distance traveled from the waiting room to the fire engine.

5.6.2 Team Member Ability

In an emergency the ability of team members to respond as quickly as possible is important. In this context, speed in responding is key. The physical ability of the team members will determine the speed in responding to an emergency call. In the present study physical ability will be measured

by the state of physical fitness among team members, namely height, weight, and cardiovascular endurance. The member ability was measured at the individual level and later aggregated to represent the team.

In the present study, the height was the measured height of the individual team members during the data collection process. Height was measured using a portable height rod (SECA, Germany) similar to the height rod being used by the Ministry of Health at the public hospitals and health centers throughout the country. Similar to previous studies height was measured with an accuracy of 0.1 mm while subjects were standing without shoes (e.g. Ramana, Kumari, Rao, & Balakrishna, 2004; Samson et al., 2000). To form the most reliable measurement, after obtaining the individual team member's height, it was averaged to represent team's height. The second physical ability in the present study was weight.

Similarly, weight was the measured weight of the individual team members during the data collection process. Weight was measured using a digital weighing scale (Tanita, Japan), certified prior to usage by Metrology Corporation Malaysia Sdn. Bhd., an authorized agency to conduct the reliability test (refer Appendix 2). The weighing scale auto calibrates its setting every time it is activated. The subjects were weighed in usual on-job attire without shoes to the nearest 0.5kg. To form the most reliable measurement, after obtaining the individual team member's weight, it was averaged to represent team's weight. The next section will explain the measurements of the final physical ability variable.

The final physical ability dimension was cardiovascular endurance of the team members. Similar to height and weight, cardiovascular endurance

was the measured cardiovascular endurance of the individual team members during the data collection process. Studies in the sports field usually measure cardiovascular endurance through a 12 minute run known as the Cooper Test which is also known as the Cooper 12 minutes run (K. H. Cooper, 1977). The subjects were required to run as far as possible on an open track in 12 minutes and the distance traveled was recorded, which represented the cardiovascular endurance score. In the present study cardiovascular endurance was measured using a modified Cooper test (Butland, Pang, & Gross, 1982) instead of the original Cooper 12 minutes run. The reason for using the modified Cooper test was because of the condition during data collection process. The fire fighters were on standby when the data was collected with attires suitable for emergency response work. Secondly, to conduct the Cooper 12 minutes run a big area or field would be required which was not possible at respective fire stations. Thirdly, the Cooper 12 minutes run would make the subjects tired and subsequently suspected to affect the emergency response activities in case of an emergency occurrence. Furthermore, extreme scenario would take place if emergency occurs during the period when the test is being conducted. Finally, other factors such as weather condition could further make assessing such information more difficult. Therefore, a modified Cooper test was chosen as the best option to measure cardiovascular endurance among the team members. In addition, the modified cooper test which is a 2-minute walking test appears to be highly correlated with the 12-minutes Cooper test and is a reproducible measure for endurance (Samson et al., 2000).

In the present study team members were required to walk individually as fast as possible for 2 minutes and the distance was recorded in meters. A standard distance of 10 meters was marked in the fire engine bay and team members were asked to walk up and down from and to the marker. The engine bay was used to minimize other factors such as weather conditions, heat, etc which would be suspected to influence the distance walked. Thus, the study has taken into consideration all these aspects to ensure that variability in distance walked, if any, very minimally influenced by external factors. Similar procedure was applied throughout the data collection process to ensure that the data was collected in a standard manner among all the teams. Similarly, to form the most reliable measurement, after obtaining the individual team member's cardiovascular endurance, it was averaged to represent team's cardiovascular endurance. All the three variables were measured at individual level and later averaged to represent the team construct. The method in operationalizing team composition is discussed in the next paragraph.

Historically, researchers have adopted three different methods in operationalizing team composition namely mean of individual scores, variance of individual scores, and the highest or lowest individual traits (Barrick et al., 1998). Within each team, individuals' responses to this measure were aggregated using mean scores to form the team member ability (weight, height, and cardiovascular endurance) measure factor (Wech, Mossholder, Steel, & Bennett, 1998). This approach of calculating the mean score for the individual measure (e.g. Bond & Ng, 2004; Chatman & Flynn, 2001; English et al., 2004; Halfhill et al., 2005; Janicik & Bartel, 2003;

O'Connell et al., 2002; Stewart et al., 2005) is the most common method (Barrick et al., 1998). Similar method of operationalizing physical ability has been used in the field of team based sports (Arnason et al., 2004). Therefore, the present study also employs the mean of individual scores method of operationalizing to represent a team level physical ability constructs.

5.6.3 Team Member Personality

Team member personality refers to the mix of team member's individual personality, as reflected in team level indexes (Barrick et al., 1998). Team members were asked to indicate the extent to which they typically demonstrated the various personality traits i.e. conscientiousness, agreeableness, emotional stability, and extraversion on a total of 23 personality items adapted from Bamber and Castka (2006). The internal reliability of the adapted items (23 items) have been reported by Bamber and Castka (2006) in their study to identify competencies connecting personality, organizational orientations, and self-reported learning outcomes among individuals whom are learning for their organizations. The study reported reliabilities .77 for conscientiousness, .74 for agreeableness, .85 for emotional stability, .86 for extraversion, and .61 for imagination. However, the dimension of imagination was dropped from this study as it was deemed to be a relevant personality dimension to the initial response performance. The dimension of imagination was associated with creativity and the task of initial emergency response does not involve creativity. In addition the reported reliability for the dimension of imagination was .61 in the previous study

(Bamber & Castka, 2006) was lower than the minimum as established by Nunnally (1978).

The personality items was rated by using a 4-point Likert scale with uniform descriptive anchors ranging from 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree. The purpose of a rating scale is to enable respondents to express the direction and strength of opinion on the statements in the questionnaire (Garland, 1991) and the use of 4-point scale is justified due to several reasons. Firstly previous studies have found using such scale increases the reliability (Bendig, 1954; Chang, 1994) and may reduce the rater's error of central tendency. Secondly, respondent's social desirability bias, which arises from the desire (a) to please the researcher or (b) to appear helpful to the researcher or (c) to not be seen to give a socially unacceptable response, can be minimized by using the four point scale (Garland, 1991). Thirdly, the four point scale was applicable based on the researcher's knowledge of respondent's awareness of what is being measured (Hughes, 1969). In the present study, the emergency responders were asked to respond to items pertaining to themselves and their respective teams. In other words, the respondents are aware of what was being examined so the usage of a 4-point scale is justified in the present study. Finally, in the case of ambiguity where the respondents are unaware of the items or consider the scale to be irrelevant, the respondent has the option to typically skip the scale leaving the researcher with a missing observation (Hughes, 1969). In addition published studies in business and psychology field have incorporated the four point scale in measuring their variables (e.g. Deshpande, 1996; Folkman, Lazarus, Gruen, & DeLongis, 1986;

Parasuraman, Zeithaml, & Berry, 1988) for reasons as above. The debate of offering or eliminating a mid-point continues; however, in the reviews by Garland (1991) and Hughes (1969) it was suggested that the decision lays largely on the preference of the researcher. In addition, Dawis (1987) stressed that there can be no single best method in scale construction, one may be good for one research problem but not for another. In the present study, the use of 4-point scale was deemed appropriate because it was found to increases the reliability of the measure, reduces social desirability bias among respondents, respondents are aware of what was being examined, respondents are given the option to typically skip the scale in the case of ambiguity, and has been used by previous researchers. Some examples of the items include "I always perform normal work without delay", "I always have time for other people", "I always want to know about other people's problems", and "I always start the conversation". A higher score indicates a higher level of each personality dimension.

Minor modifications have been made to the questionnaire to suit the study sample. The word "I" was added to each item. At individual level, scores were averaged across item to form each scale score. These averaged score represented the team score for each item. The instrument for this study was administered at the individual level and later aggregated to represent the team personality. The same approach in aggregating individual response to represent the team level score used in the team member ability construct was applied to the team member personality construct. Within each team, individuals' responses to this measure were aggregated using mean scores to form the team personality measure factor based on the reliability and

validity test outcomes. For the ten negatively worded statements (item 3, 12, 13, 14, 15, 16, 17, 21, 22, and 23) the scores were reversed so that a higher score represents higher level of a specific personality trait and a lower score represent lower level of a specific personality trait.

5.6.4 Team Demography

Demography refers to the degree to which members of a team share common demographic attributes which constitute a structural property of a team (Robbins, 1993). Teams are composed of cohorts, which is defined as members holding a common attribute. As mentioned above, the present study examined the impact of demographic variables of age and tenure on initial emergency response performance. The following sections will explain the measurement of both demographic variables namely age and tenure.

5.6.4.1 Age diversity

Age diversity refers to the dispersion of age among team members. Age was measured at the individual level by requesting each team member to state their actual age. As in past operationalizations of age diversity (e.g. Bantel & Jackson, 1989; Ely, 2004; Kang et al., 2006; O'Reilly et al., 1989; Timmerman, 2000; Wiersema & Bantel, 1992), the present study used the coefficient of variation, defined as the standard deviation divided by the mean. For interval data, Allison (1978) provides a review and observes that the coefficient of variation (the standard deviation divided by the mean)

provides a direct method for obtaining a scale invariant measure of dispersion. It is appropriate for interval level variables with a theoretically fixed zero point.

5.6.4.2 Tenure diversity

Organizational tenure diversity refers to the dispersion of organizational tenure among team members. Similar to age, organizational tenure was measured at the individual level by requesting each team member to state their actual duration of service with Fire and Rescue Department of Malaysia (FRDM). As in past operationalizations of organizational tenure diversity (e.g. Ancona & Caldwell, 1992; Ely, 2004; Kang et al., 2006; Michel & Hambrick, 1992; Wiersema & Bantel, 1992), the present study used the coefficient of variation, defined as the standard deviation divided by the mean. In the view that, data on organizational tenure was captured as an interval data, the coefficient of variation would be the best method for obtaining a scale invariant measure of dispersion (Allison, 1978).

5.6.5 Team Leadership

In this study, leadership style refers to the team member's perceived leadership style being demonstrated by their respective leader. In the present study the instrument on perceived leadership style from Ogbonna and Haris (2000) and Haris and Ogbonna (2001) were adapted. A review of literature pertaining to the measurement of leadership suggested that a large number

of measures might be possibly appropriate (e.g. Manz & Sims, 1987; Shamir, Zakay, Breinin, & Popper, 1998) for this study. The measure of perceived leadership style of House (1971a; 1971b) and House and Dessler (1974) which was partially based on earlier works by Fleishman (1957) and Stogdill (1963) has been widely accepted as a reliable and valid measure by a number of researchers and has also been widely used in a variety of literatures and accepted as a good measure of subordinate's perception of leadership style (e.g. Harris & Ogbonna, 2001; Kohli, 1989; Ogbonna & Harris, 2000; Teas, 1981). The original study by Ogbonna and Haris (2000) and Haris and Ogbonna (2001) had three dimensions of leadership style namely participative leadership style, supportive leadership style, and instrumental leadership style. However, the present study adapted only the items of supportive leadership and instrumental leadership. The third factor, participative leadership style was dropped due to its irrelevancy to the initial emergency response. The dimension of participative leadership style was defined as a non-directive form of role-clarifying behavior which is gauged by the extent to which leaders allows subordinates to influence decisions by requesting input and contribution (Harris & Ogbonna, 2001; Ogbonna & Harris, 2000). Normally, decisions in emergency and initial emergency is done solely by the team leader and in some instances by the superior officers. In addition to that, the participative leadership style also measure the individual perception of the degree to which he or she is allowed to participate in organizational decisions (Hackman & Oldham, 1974). Based on my personal observation and interview with the team leader and other team members during data collection, I was told that the team members very rarely

involve in decision making in their respective teams and organization in terms of responding to an emergency. This justifies the reason to include only the dimensions of supportive leadership and instrumental leadership. Thus, in the present study the eight items instrument on perceived leadership style was adapted comprising of four items each on supportive leadership and instrumental leadership.

Studies found high internal reliability (Cronbach Alpha) among supportive leadership (0.77), and moderate on instrumental leadership (0.66) (Harris & Ogbonna, 2001; Ogbonna & Harris, 2000). Even though the internal reliability for instrumental leadership is moderate and below the minimum as established by Nunnally (1978), it was used because this measure was principally based on earlier researchers (Fleishman, 1957; Stogdill, 1963) and presented as a reliable, valid, and has been widely used in a variety of literatures and accepted as a good measure of perception of leadership style (e.g. Harris & Ogbonna, 2001; Kohli, 1989; Ogbonna & Harris, 2000; Teas, 1981). The team members were asked to indicate the extent to which their perceived leadership style being demonstrated by their leader by using a 4-point Likert scale format, from (1) "Strongly Disagree" to (4) "Strongly Agree". The justification of the 4-point likert scale is as explained in the earlier section. Some examples of the items include "He helps people to make working on their tasks more pleasant", "He treats all group members as equals", "He explains the way tasks should be carried out", and "He schedules the work to be done". Higher ratings by team members indicate a higher level of each leadership style dimension.

Responses on the leadership style was only included when two conditions are met (O'Connell et al., 2002). First, the rated team leader had to have been in that position with the current team for at least 6 consecutive months and secondly, to provide rating of leadership style team members had to have been in the current team for at least 6 consecutive months. Thus, team leaders and members providing ratings had been working together on a daily basis for at least 6 months. Newcomers are far less familiar with the team's recent history, its local custom, and with team informal rules (McNeil & Thompson, 1971). Therefore, this period of team tenure allows teams go through different stages of socialization, innovation and stability (Katz, 1982).

Minor modifications have been made to the questionnaire to suit the study sample. The word "He" was replaced by the word "My Ketua Ahli Bomba" and the word "group" was replaced by the word "team". Similar to the personality construct, leadership style were measured at individual level. Later individual scores were aggregated using mean scores to form the team leadership style measure factor based on the reliability and validity test outcomes.

5.6.6 Team Role

Team role refers to how important the role of a fire and rescue officer is to a team member. The present study adapted the measures of role identity salience from Callero (1985). The measure of team roles was derived from extant literature. A review of literature pertaining to the measurement of roles

suggested that a large number of measures might be possibly be appropriate (e.g. Bales & Cohen, 1979; Beehr, Walsh, & Taber, 1976; Reilly, 1982; Rizzo, House, & Lirtzman, 1970). However, the measure of role identity salience developed by Callero (1985) has been widely accepted as a reliable and valid measure by a number of researchers and also has been widely used in a variety of literatures and accepted as a good measure of role identity (e.g. D. E. Benson et al., 1994; Callero, 1992; Callero et al., 1987; Charng et al., 1988; Gargano et al., 2004). In the original study the five item measure asked the respondents to indicate the extent to which "blood donor" is viewed as a part of the self. In the present study the respondents were asked to indicate the extent to which being a fire and rescue officer is viewed as a part of the self. Previous studies reported high internal reliability of between 0.81 to 0.71 (Cronbach Alpha) (D. E. Benson et al., 1994; Callero, 1992; Callero et al., 1987; Charng et al., 1988; Gargano et al., 2004) and are above the minimum 0.70 as established by Nunnally (1978). The present study used a 4-point Likert scale format, ranging from (1) "Strongly Disagree" to (4) "Strongly Agree". ". The justification of the 4-point likert scale is as explained in the earlier section. Some examples of the items include "I would feel a loss if I was forced to stop being a firemen and a rescuer", "For me, being a firemen is more of a task of only extinguishing fires and rescuing", and "Extinguishing fires and rescuing are important parts of who I am". Similar to the above variables higher ratings by team members indicate a higher level of role identity salience. Similar to the leadership style construct to provide rating of roles, team members had to have been in the current

team for at least 6 consecutive months (O'Connell et al., 2002) to allow members in teams to stabilize (Katz, 1982).

Minor modifications have been made to the questionnaire to suit the study sample. Firstly, the word "blood donor" was replaced by the word "fire fighter and rescuer". Secondly, the third item "I really don't have clear feelings about responding to emergency" which was negatively worded in the actual measure was then replaced with a positively worded "I really have clear feelings about responding to emergency" statement. The main purpose of negatively worded statements was to keep respondents alert and to encourage them to read statements carefully. However, since many respondents have expressed concern over the negatively worded statement during the pilot study, the particular negative statement was changed to a positive format. Similar effort was taken by Parasuraman, Zeithaml, and Berry (1991) where in the 1988 SERVQUAL instrument, nine of the 22 items were negatively worded, however, since many researchers have expressed concern over the negatively worded statements, so they changed all these negative statements to a positive format. Finally, an additional item was included to increase the item to six (6) items. The included item was negatively worded statement of the first statement. The item "I always think of my job as a fire fighter and rescuer" was negatively worded as "I rarely think of my job as a fire fighter and rescuer" and included as the sixth item in the measure. The additional item was to intended to keep respondents alert and to encourage them to read statements carefully (Akbaba, 2006). In addition, multiple-item scale is stressed to increase the potential for scale reliability and, correspondingly, construct validity (Fox, Scott, & Donohue, 1993).

Consistent with the personality and leadership constructs, role identity salience was measured at individual level and later aggregated using mean scores to form the team role identity measure factor based on the reliability and validity test outcomes. In addition, the one negatively worded statement, the scores were reversed so that a higher score represents a higher level of team role identity salience and a lower score represents a lower level of team role identity salience.

5.6.7 Team Norm

Team norm refers to the degree of importance team members place on their personal interest and shared pursuits. In the present study, the investigation is on the cooperative norms among member which reflects the degree of importance fire fighting team members place on their shared pursuits, shared objectives, and mutual interest to achieve mutual goals (Chatman & Flynn, 2001). Cooperative team norms was measured using five items from Chatman and Flynn (2001). After reviewing literatures pertaining to the measurement of norms it was found that a large number of measures might be possibly be appropriate (e.g. Cai & Yang, 2008; Earley & Erez, 1991; Erez & Earley, 1987; Janicik & Bartel, 2003; Langfred, 1998; Wageman, 1995). However, the measure of cooperative norms developed by Chatman and Flynn (2001) has been used in the present study because it has been previously administered at team level and has a relatively higher reported reliability score. The previous study found internal reliability (Cronbach Alpha) for cooperative norms to be 0.77 (Chatman & Flynn, 2001) and are above

the minimum 0.70 as established by Nunnally (1978). The instrument used a 4 point Likert scale from (1) Strongly Disagree to (4) Strongly Agree. ". The justification of the 4-point likert scale is as explained in the earlier section. Examples of items include "It is important for us to maintain harmony within the team", "There is little collaboration among team members"[reverse-coded], and "There is a high level of cooperation between team members". Similarly, higher ratings by team members indicate a higher level of role identity salience. Similar to the leadership style and team roles constructs, to provide rating of norms, team members had to have been in the current team for at least 6 consecutive months (O'Connell et al., 2002) for team members to socialize, innovate and stabilize (Katz, 1982).

Minor modifications have been made to the questionnaire to suit the study sample. The word "group" was replaced by the word "team". Similar to the above constructs, cooperative norms was measured at individual level and later aggregated using mean scores to form the team cooperative norms measure factor based on the reliability and validity test outcomes. In addition, the one negatively worded statement, the scores were reversed so that a higher score represents a higher level of team cooperative norms and a lower score represents a lower level of team cooperative norms.

5.6.8 Team Cohesiveness

In this study team cohesiveness refers to the extent to which group members feel a part of the group and their desire to remain in the group. In the present study the combination of cohesiveness measures developed by Dobbins and

Zaccaro's (1986) group cohesion scale and, Rosenfeld and Gilbert's (1989) classroom cohesion questionnaire were adapted. A review of literature pertaining to the measurement of team cohesiveness suggested that a large number of measures might be possibly appropriate (e.g. Beehr, 1976; Dailey, 1978; Langfred, 1998; Podsakoff & MacKenzie, 1994; Stashevsky & Koslowsky, 2006; Wech et al., 1998). The measure of team cohesiveness Dobbins and Zaccaro (1986) and Rosenfeld and Gilbert (1989) which was partially based on earlier works by Beehr (1976), Festinger (1950), Libo (1953), Piper, Marrache, Lacroix, Richardsen, and Jones (1983), Seashore, Lawler, Mirvis, and Cammann (1982), and Zaccaro and McCoy (1985) has been widely accepted as a reliable and valid measure by a number of researchers. The instrument has also been widely used in a variety of literatures and accepted as a good measure of team cohesiveness (e.g. Kidwell, Mossholder, & Bennet, 1997; Kidwell & Robie, 2003; Rozell & Gundersen, 2003; Stewart et al., 2005; Zaccaro & Dobbins, 1989). Another reason for adapting the above measure was the review of cohesiveness research and measures by Mudrack (1989) which suggested that the cohesiveness field moved beyond conceptualizing cohesiveness simply in terms of attraction to or positive attitudes about a group. Additionally, it was emphasized that consideration should be given to mutual commitment among group members to one another and their task. The group cohesiveness measure developed by Dobbins and Zaccaro (1986) was cited by Mudrack (1989) as one that moved in this conceptual direction and was easily adapted for organizational use. In line with the present study, identification with the team (i.e. commitment of members to one another) was

held to be a part of the underlying reasons for hypothesizing the moderating effects, it was important for the cohesiveness measure to tap this concept. Therefore, the present study utilized an 8 item scale modified from Dobbins and Zaccaro (1986) to measure team cohesiveness. However, the present study also included an additional three items from Rosenfeld and Gilbert's (1989) classroom cohesion questionnaire. with a purpose to broaden the measure of respondent's perceptions of group cohesiveness used by Dobbins and Zaccaro (1986). Indeed, Dobbins and Zaccaro (1986) stressed the importance of considering a wide range of cohesiveness in the study of cohesiveness and its effect. Furthermore, multiple-item scale increases the potential for scale reliability and, correspondingly, construct validity (Fox et al., 1993).

A total of eleven items were used to assess respondent's perceptions of team cohesiveness. Eight items were adapted from the measures by Dobbins and Zaccaro's (1986) group cohesion scale and additional three items were adapted from Rosenfeld and Gilbert's (1989) classroom cohesion questionnaire. The previous study found internal reliability (Cronbach Alpha) for group cohesion scale to be 0.91 (Dobbins & Zaccaro, 1986) and are above the minimum 0.70 as established by Nunnally (1978). All items were rated on a 4-point Likert scale ranging from (1) Strongly Disagree to (4) Strongly Agree. ". The justification of the 4-point likert type scale is as explained in the earlier section. Examples of items include "If given a chance, I would choose to leave my team and join another [reverse-coded]", "I feel that I am really a part of my team", and "I want to remain a member of my team". Similarly, higher ratings by team members indicate a higher level of

team cohesiveness. Similar to the team structure constructs, to provide rating of team cohesiveness, team members had to have been in the current team for at least 6 consecutive months (O'Connell et al., 2002) for team members to socialize, innovate and stabilize (Katz, 1982).

Minor modifications have been made to the questionnaire to suit the study sample. Firstly, the word "group" was replaced by the word "team". Secondly, similar to the team member resources and structure constructs, team cohesiveness constructs were measured at individual level and later aggregated using mean scores to form the team cohesiveness measure factor based on the reliability and validity test outcomes. In addition, the two negatively worded statement, the scores were reversed so that a higher score represents a higher level of team cohesiveness and a lower score represents a lower level of team cohesiveness.

5.7 MEASUREMENT INSTRUMENTS

5.7.1 Team Member Questionnaire

To collect the data for the study one set of questionnaire was prepared to be answered by team members (team member questionnaire). Each team member was assigned a code number for identification based on the fire station, respondent number, and team he/she is attached to. The code for each fire station was abbreviation of the fire station (i.e. Jertih was written as JRT), while the respondent number (i.e. 1, 2, 3, 4, 5, etc) was based on the number of team members available during the data collection period.

Meanwhile, the teams were indicated based on the team shift identification (i.e. A, B, or C). The coding was done for the purpose of matching the individual responses with their respective teams. Within the SPSS data file, demographic factors (8 items), self-ratings of personality (23 items), leadership (8 items), roles (6 items), norms (5 items), cohesiveness (11 items), physical fitness (3 items), and weighted initial emergency response time (1 item) were keyed-in using the first 65 columns.

The cover letter on first page of the questionnaires stresses that the survey is for scientific purposes only and all responses will be kept private and confidential. In addition, the cover letter included the approximate time to complete the survey, identification of the researcher, purpose of the survey, the objective of the study, how the data will be used, and expression of appreciation for participating and responding.

The team member questionnaire contained 64 items which was divided into seven sections as follows; (a) Section A - demographic information, (b) Section B – self-ratings of perceived team member personality, (c) Section C - self-ratings of perceived team leadership style, (d) Section D - self-ratings of perceived team role identity, (e) Section E - self-ratings of perceived team cooperative norms, (f) Section F - self-ratings of perceived team cohesiveness, and (g) Section G – team member ability (weight, height, and cardiovascular endurance) based on the measurement conducted during data collection period. Table 5.2 shows the item distribution for the team member questionnaire (refer to Appendix 3, for the detail sample of team member questionnaire).

Table 5.2

Distribution of Items in the Team Member Questionnaire

Variable	Number of Items	Number of Adapted Items
SECTION A		
Demography	8	1,2,3,4,5,6,7,8
SECTION B		
Team Member Personality	23	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23
SECTION C		
Team Leadership Style	8	1,2,3,4,5,6,7,8
SECTION D		
Team Role Identity	6	1,2,3,4,5,6
SECTION E		
Team Cooperative Norm	5	1,2,3,4,5
SECTION F		
Team Cohesiveness	11	1,2,3,4,5,6,7,8,9,10,11
SECTION G		
Team Member Ability	3	1,2,3
Total	**64**	

5.7.1.1 Response formats

As mentioned earlier, a 4-point Likert type scale with uniform descriptive anchors ranging from 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree was used to measure all items in section B to section F. The purpose of a rating scale is to enable respondents to express the direction and strength of opinion on the statements in the questionnaire (Garland, 1991). In the present study, the use of 4-point scale was deemed appropriate because it was found to increases the reliability of the measure (Bendig, 1954; Chang, 1994), reduces social desirability bias among respondents (Garland, 1991), respondents are aware of what was being examined (Hughes, 1969), respondents are given the option to typically skip

the scale in the case of ambiguity (Hughes, 1969), and has been used by previous researchers (e.g. Deshpande, 1996; Folkman et al., 1986; Parasuraman et al., 1988). The usage of Likert type scale represents the position and the preference of an individual towards an object. In addition, the resulting single score of the overall responses reflects different patterns of belief, intention, and actions (Ajzen & Fishbein, 1980). The final component of the instrument consists of items in section A which tapped demographic information while items in section G tapped the team member ability information. The second measurement instrument was the customized form developed to collect the initial emergency response data, which is, discussed in the next section.

5.7.2 Customized Form for Initial Emergency Response Time

A customized form was developed to collect the dependent variable (initial emergency response time) data. The data was filled by the researcher who would take record the initial emergency response time from the "Occurrence Book". The customized form contained eight items which was as follows; (a) name of the fire station, (b) name of the team, (c) date of emergency incident, (d) time of emergency call received, (e) time of fire engine leaving the station, (f) interval of initial emergency response time, (g) type of emergency, and (h) remarks of the nature of incident. The name of the fire station and name of the team of that particular fire station was included in the dependent variable questionnaire for the purpose of matching the team member questionnaires with the dependent variable questionnaires (refer

Appendix 4, for the detail sample of the dependent variable's customized form). Once the response format was finalized, the instrument was required to be translated. The process of translation is detailed out in the next section.

5.7.3 Translation

The original questionnaire had been prepared in English. However, because the respondent understood English to a certain extent, and in order to ensure that every respondent understood well the items/statements asked, the entire instrument was translated into Malay. A back translation method was used to ensure equivalence of measures is achieved in both Malay and English (Brislin, 1970). The English version of the questionnaire was translated into standard Malay by an adult Malay, who is bilingual. The individual has vast experience in translation and has attended various courses in translation organized by Dewan Bahasa dan Pustaka (DBP). Dewan Bahasa dan Pustaka (Malay for The Institute of Language and Literature) (abbreviated DBP) is the government body responsible for coordinating the use of the Malay language in Malaysia.

Later the Malay version of the questionnaire was back translated into English by another individual who is providing translation services, operating in a public university. The individual is well versed in both Malay and English. The researcher held a few discussions with the translators in order to make sure that the original meanings were maintained each time after the translation was conducted. A comparison between the original version of the English questionnaire and the back translated English version questionnaire

was done and suggested that no major rewording was needed for any particular item. Similar translation method was used in a study investigation the mediating effects of group cohesiveness and moderating effects of individualism/collectivism on the relationship between job characteristics and performance among team members working in the Hong Kong offices of a large multinational bank (Man & Lam, 2003). However, in that study the instrument was translated into Chinese as compared to Malay in the present study.

5.8 AGGREGATING INDIVIDUAL RESPONSE INTO TEAMS

Team level variables are aggregates of individual response. Aggregation method is done to demonstrate that the aggregated data reflects team-level attributes (Kirkman, Tesluk, & Rosen, 2001). Justification for aggregation is very much derived from the works of Schneider (1975), Schneider and Reichers (1983), and Schneider and Bowen (1985), suggesting that similarity within settings is to be expected. In addition it is argued that to test whether aggregation is appropriate, one needs to determine whether there is agreement within settings. According to George (1990), to justify aggregation one must demonstrate agreement within a group rather than differences across groups. This present study is guided by the suggestions by Schneider and Bowen (1985) who states that the appropriate test for within setting agreement would be a measure of homogeneity rather than an index like analysis of variance (ANOVA) or the intra-class correlation coefficient (ICC) that depends upon between setting differences for significance. In addition,

indices like the ICC may yield inaccurate or artificially low estimates of agreement (James et al., 1984).

The present study employed two techniques to demonstrate the agreement in the teams before aggregating them in team-level variables. The first technique was the within group interrater reliability index developed by James et al. (1984) and later recognized as a interrater agreement index (James, Demaree, & Wolf, 1993; Kozlowski & Hattrup, 1992). The second technique was a revised index of interrater agreement following the work of Lindell, Brandt, and Whitney (1999). The latter technique was an advancement from the works of James et al. (1984). In a study by Waldman et al. (2004), they found that the modified technique by Lindell et al. (1999) is more appropriate as a measure of interrater agreement for multiple-items instruments, than earlier techniques by James et al. (1984). It was further argued that the Lindell et al.'s (1999) technique does not inflate results as compared to its predecessors (Lindell & Brandt, 1999).

However, in the present study both the interrater agreement index (James et al., 1984) and the modified interrater agreement index (Lindell et al., 1999) was used to demonstrate whether there is agreement within teams before aggregating into team-level variables. Both these tests provided support, indicating substantial agreement among members of the team on member's perception of personality, team leadership style, team roles, team norms, and team cohesiveness to produce averaged, aggregated scores for respective teams. The detail formulation of both these indices is explained in the Chapter 7.

5.9 PILOT STUDY

A pilot study was conducted among 81 emergency responders from five fire stations in Kedah. The distribution and collection of the questionnaires was done in a self-administered manner personally by the researcher. This ensured a 100% response rate. The pilot study was intended to obtain response on the interval scale items only (i.e. personality, leadership, roles, norms, and cohesiveness). The objective scale items (i.e. weight, height, cardiovascular endurance, age, and tenure) were not included in the pilot study because ratio items were not included in assessing internal reliability of a variable. The responses of the pilot study were not included into the main study. Internal consistency of the interval scale measures based on the 81 questionnaire was determined through a reliability analysis using the Cronbach Alpha.

The information in Table 5.3, shows the interval scale variables that were used in the study. All the variables show a high internal reliability value ranging from 0.71 to 0.91. The reliabilities indicated in Table 5.3 suggest that the indicators are sufficient for use because the values are higher than the reliability indicator provided by Nunnally (1978).

Table 5.3

Reliabilities of Constructs for Pilot Study

Variables	Alpha
Personality	0.76
Leadership	0.91
Roles	0.71
Norms	0.72
Cohesiveness	0.90

5.10 MAIN STUDY

5.10.1 Population

Since the study is about examining emergency response performance, it was appropriate that these people involved with emergency response work were considered. In this context, the present study has chosen to study the topic amongst fire fighting teams employed by the employed by the Fire and Rescue Department of Malaysia under the Ministry of Housing and Local Government in Peninsular Malaysia. Specifically, only Fire Officers in the operation section who responds to the fire engine were selected. Another reason for choosing this group of people was because they are recognized as one of the key players responding to an emergency in Malaysia (National Security Division Prime Minister's Department, 2003). In most emergency instances, the Fire and Rescue Department of Malaysia will act as the main agency in emergency response and mitigation operations.

But amongst fire fighting teams, only those who are responding to emergency calls and not the entire personnel that work in a fire station. The responding teams are considered because in an emergency response, individuals work in teams. In addition emergency work requires a coordinated response of interdependent team members to minimize effectively the impact of an emergency (Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995). Therefore, the unit of analysis of the present study is team. Based on the latest statistics from Fire and Rescue Department of Malaysia (FRDM), as of 1st January 2007, the total number of fire fighting teams employed by the Fire

and Rescue Department of Malaysia (FRDM) in Peninsular Malaysia is as follows:

Table 5.4

Total Paid Fire Fighting Teams in Peninsular Malaysia

State	Total Fire Stations	Number of paid fire fighting teams	%
Perlis	3	9	1.5
Kedah	15	44	7.6
Penang	14	36	7.1
Perak	27	69	13.5
Selangor	29	78	15.7
Kuala Lumpur	16	48	8.6
Negeri Sembilan	13	33	6.6
Malacca	7	19	3.5
Johor	19	45	10.6
Pahang	20	54	10.1
Terengganu	15	45	7.6
Kelantan	15	40	7.6
Total	193	520	100

Source: Fire and Rescue Department Malaysia (FRDM), 2007

Table 5.4 indicates that as of 1st January 2007, the total number of paid fire fighting teams in Peninsular Malaysia is 520. The study was conducted among paid fire fighting teams because the voluntary fire squad will not have proper records of their response time. The teams are inclusive of fire stations that employ two and three teams in a station.

5.10.2 Sample Size

As a matter of practicality, sampling was conducted rather than collecting data from every element of the population (Sekaran, 2003; Zikmund, 2003) because, selecting a sample is likely to produce more reliable results (Sekaran, 2003).

To select the sample, an area sampling technique was used. Area sampling is the most popular type of cluster sample when the design constitutes geographic clusters (Sekaran, 2003). The aim of cluster sampling is to sample economically while retaining the characteristics of a probability sample where the clusters are randomly selected (Zikmund, 2003). The usage of area sampling is an ideal technique when the cluster is heterogeneous as the population (D. L. Davis, 2000; Zikmund, 2003). The clusters in the present study are heterogeneous as fire fighting teams consist of individuals with various demographic background and variety of traits, attitudes and behavior which are similar to those in the population. In the present study the clusters were identified as states in peninsular Malaysia.

The usage of area sampling based on states was justified based on the following reasons. First, mail survey data collection was not possible. Secondly, was the need to assess the physical ability of the team members, and measuring the distance traveled from the waiting room to the fire engine requires the researcher to visit each fire station in the selected states. Thirdly, the researcher himself had to visit each station to explain the method of recording the data for the criterion variable. Finally, there was a need to observe and understand extraneous variables such as physical condition of

the fire station, condition of the fire apparatus, condition of the fire engine and etc at each selected fire station. This was important because the effects of extraneous variables may affect the hypothesized IV-DV relationship (D. R. Cooper & Schindler, 2003; Zikmund, 2003).

Sample size for this study consisted of 226 teams, which is exact match of what has been specified by Krejcie and Morgan (1970), that is 226 for a population of 550. Furthermore, the sample size of the present study complied with the rule of thumb by Roscoe (1975) who stated that for most research sample size bigger than 30 and less that 500 are appropriate. Therefore, 226 is adequate based on the rule of thumb. Secondly, in a multivariate research, i.e. multivariate analysis, the sample size should be several times (preferably 10 or more times) as large as the number of variables. In the present study there are 8 variables and the required sample size should be 80 or more.

Therefore, in this study five states comprising Penang, Federal Territory of Kuala of Kuala Lumpur, Selangor, Malacca, and Terengganu have been randomly selected as the sample. The selected sample size can be considered reasonable and manageable in terms of cost and time. The procedure involved in selecting the sample is discussed in the following section.

5.10.3 Sampling Technique

How were 226 teams selected? In this section, a detailed procedure on how this was possible will be presented. To ensure an equal distribution of fire

fighting teams among the states in Peninsular Malaysia, an area sampling as mentioned above was used and illustrated as follows. According to Gay and Diehl (1992), the use of this technique of sample selection involves five steps. The first step is to define the population. Here the population is 520 teams (see Table 5.4). Next, the sample size of 226 was determined based on Krejcie and Morgan's (1970) table for determining a sample size. Subsequent step involved defining a logical cluster. The logical cluster in the present study is the states in Peninsular Malaysia. Fire stations are located in each state in Peninsular Malaysia. An average number of population elements per cluster were then estimated by dividing the population size (i.e. 520 teams) by the number of clusters (i.e. 12 states). This resulted in 43.33 elements per cluster. Finally the number of cluster was determined by dividing the determined sample size (i.e. 226) by the estimated size of a cluster (i.e. 43.33), which resulted in 5.21 clusters or states. This means that a minimum of 5 clusters/states needs to be randomly selected. If the number of sample does not meet the determined sample size then an additional state needs to be randomly selected. Based on the above calculation, five clusters/states in Peninsular Malaysia were randomly selected.

To choose five states out of twelve states, a simple random sampling was selected. Each state's name was written in different pieces of paper, which were later selected randomly until five states were chosen. As a result of this procedure the five states selected were Penang, Federal Territory of Kuala of Kuala Lumpur, Selangor, Malacca, and Terengganu. The overall sample size in the five states/cluster was 226 teams and this was exactly the number of the predetermined sample size and hence an additional

cluster/state was not necessary. The description of the sample size is indicated in Table 5.5.

Table 5.5

Total Number of Sample

State	Total Number of Fire Stations	Number of paid fire fighting teams	Percentage (%)
Kuala Lumpur	16	48	21.3
Selangor	29	78	34.5
Malacca	7	19	8.4
Penang	14	36	15.9
Terengganu	15	45	19.9
Total	81	226	100

Source: Fire and Rescue Department Malaysia (FRDM)

5.10.4 Data Collection

The present study required very minimal interference by the researcher in the sense that the researcher administered the questionnaires only. The present study was conducted at the field setting using the same natural environment (Sekaran, 2003). Field studies are ex post facto designs because researchers make no attempt to control or manipulate the variables of study (D. L. Davis, 2000). Data for the present study were obtained from the fire fighting team members in the selected five states in Peninsular Malaysia. Written permission to conduct the study at the Fire and Rescue Department Malaysia was obtained earlier from the Director General of Fire and Rescue Department of Malaysia (see attached letters in Appendix 5) who then appointed an officer to assist the researcher at the headquarters in Putrajaya. The officer was the liaison person for the researcher to obtain details

(number of fire stations, number of fire fighting teams, addresses of fire stations, contact person at state and respective station, and etc) for the purpose of the present study. With the permission letter, prior to the development of the research model and the criterion variable measures, several visits were made by the researcher to three fire stations in Kedah namely Alor Setar, Jitra, and Bukit Kayu Hitam. The visits enabled the researcher to gather some valuable and firsthand information on how fire fighters work, the pattern of response time, etc. The appointed officer also assisted in providing the sampling frame to assist in the choice of an appropriate sampling technique and to finalize the sample size for the present study.

As mentioned earlier, to obtain the relevant data, two major visits were made to each fire station in the selected five states. In the first visit, the researcher administered the questionnaires and measured the team member's physical abilities of all teams in all stations that participated in the study. During the first major visit, the researcher had to repetitively visit each team in the respective fire station in the selected five states. This repetitive visit depends on the number of teams in the respective fire station in the selected five states. Most of the fire stations had three teams working on a 12 hour shift, while some had two teams working on a 24 hours shift. To ensure adequate response rate, the data collection process was personally administrated by the researcher. The activities involved during the first major visit were to brief the intention of the study and conducting the physical ability tests. The questionnaires were collected on the same day they were

administered by giving adequate time to fill the questionnaire and to participate in the physical ability test.

The second visit was for the researcher to get data on the criterion variable. Thus, data such as number of incident date of each emergency incident took place, time emergency call received, time of fire engine leaving the station, interval time of initial emergency response time, type of emergency, and nature of incident were recorded. These data were recorded on a customized form developed specifically for this study. The criterion variable data for each team in the respective stations were collected on the same visit. In addition the distance between the waiting room and the fire engine was measured in each fire station and later was weighted to the initial emergency response time.

Both of these visits took place within 210 days, beginning from early April 2007 until mid of November 2007. The researcher traveled approximately a total of 35,000 km throughout the five states to collect the data for this study.

5.10.5 Data Analysis

Upon completing the task of data collection, preliminary test was conducted to determine the response rate, inter-rater agreement, reliability, and validity of the study construct. Factor analysis and reliability analysis were used to assess the validity and reliability of the independent variables of team member personality, team leadership, team roles, and team norms, as well as the moderator variable of team cohesiveness. Response rate was

computed by calculating the frequency and percentage of response and later compared to the sample size determined before data collection. The descriptive statistics namely mean, median, standard deviation, frequencies, and percentage were used to describe the main characteristics of the sample.

5.10.5.1 Goodness of measure

As noted earlier because the independent variables are multidimensional construct, factor analysis was conducted in the study. Prior to testing the relationship among the variables under study a Principle Component Analysis (PCA) method with varimax rotation (Hair, Anderson, Tatham, & Black, 1998) was used to identify the underlying dimensions of each construct. The usage of factor analysis enables the production of descriptive summaries of data matrices which later aid in detecting meaningful patterns among the set of variables (Dess, Lumpkin, & Covin, 1997). The principle component analysis is the most frequently used factor extraction method (D. R. Cooper & Schindler, 2003). In addition the varimax rotation method is known to give a clearer separation of factors (Hair et al., 1998). Factor analysis was conducted on team member personality, team leadership style, team roles, team norms, and team cohesiveness with a criteria that a given item should load 0.50 or higher on a specific factor and have a loading no higher than 0.35 on other factors (Igbaria, Iivari, & Maragahh, 1995).

Items that have been separated into respective factors through the factor analysis were subjected to a reliability analysis before computing them

to represent the latent variable. Reliability represents the internal consistency which indicates the homogeneity of items in the measure that is measuring the latent variable (D. R. Cooper & Schindler, 2003). The reliability analysis measures the extent to which a variable or a set of variable is consistently measuring what it intended to measure (Hair et al., 1998). Cronbach's Alpha is the recommended measure of internal consistency of a set of items (Sekaran, 2003) and is one of the most commonly used reliability coefficients (Coakes & Steed, 2003). A reliability analysis was conducted on the scales used to measure items of team member personality, team leadership style, team roles, team norms, and team cohesiveness. The generally accepted level of Cronbach's Alpha reliability lower limit value should be more than Nunnally's (1978) recommended 0.70. Items of each construct, which were subjected to reliability and factor analysis, were used for further analysis. The results of factor and reliability analyses are reported in the following chapter.

5.10.5.2 Goodness of fit

I. Bivariate correlation and multiple regression

Two separate bivariate correlations were conducted, firstly, to test the relationship between team member resources (team weight, team height, team cardiovascular endurance, and team personality variables) and team performance (initial emergency response time), and secondly, to test the relationship between team structure (team age diversity, team tenure diversity, team leadership style, team roles, and team norms) and team

performance (initial emergency response time). The correlation analysis results reveal the direction, strength, and significance of the bivariate relationships of the study variables (Sekaran, 2003). Meanwhile multiple regression was used to test the significant predictors of team performance (initial emergency response time) from both team member resources (team weight, team height, team cardiovascular endurance, and team personality variables), and team structure (team age diversity, team tenure diversity, team leadership style, team roles, and team norms). Multiple regression test will provide understanding of how much variance in the dependent variable is explained by the independent variables when theorized to influence simultaneously the former (Sekaran, 2003).

II. Hierarchical multiple regression

Hierarchical multiple regression analysis was utilized to test whether team cohesiveness will moderate the relationships of team structure variables (team age diversity, team tenure diversity, team leadership style, team roles, and team norms) to team performance (initial emergency response time).

The use of hierarchical multiple regression in research concerning the detection of moderating effects have been recommended by Chaplin (1991), J. Cohen and Cohen (1983), Stone and Hollenbeck (1984), and Zedeck (1971). In addition Baron and Kenny (1986) suggested the use of multiple regression in detecting moderating effect as the most appropriate test.

To test the moderating effects of team cohesiveness, a number of steps were taken that involve entering the sets of predictors into the

regression equation in an order. The first step requires the main effects of team structure variables to be entered into the equation. The second step requires the moderator variable of cohesiveness to be entered into the equation. Finally, the third step requires the two-way interaction term to be entered into the equation. The two-way interaction term can be obtained by multiplying the moderator with the variables of team structure.

5.11 SUMMARY

This chapter has describes the methodology used, which includes the measurement of variables, survey instrument, translation, sampling, data collection strategies and methods of data analysis to answer the research questions. In addition it has also explained the process of checking the reliability of the construct instruments based on the pilot study conducted prior to the actual study. The details of the population and sample of this study are also presented. The following chapters will explain the validity and reliability tests conducted on the study construct instruments, especially the team member personality, team leadership style, team roles, team norms, and team cohesiveness based on the data collected for the main study. In the view that the study was conducted among teams; the descriptive characteristics of the respondents will be presented in two parts. The first part will describe the characteristics of the respondents while the second part will describe the characteristics of the teams. In addition, the following chapter also includes the test of relationship between team member resources, team structure, and initial emergency response performance.

CHAPTER SIX

FINDINGS

6.1 INTRODUCTION

This chapter analyzes the goodness of measures through validity, reliability analysis of measures being used, and analyzes the relation between team member resources, team structure, and initial emergency response performance based on the data gathered from the questionnaire survey in the present study. The first section explains the interrater agreement, validity, and reliability analyses while the second section explains the response rate, description of the study sample at the individual and group level. The third section contains descriptive analyses of the study variables, and the last section the use of multivariate analysis to test the study hypotheses.

6.2 INTERRATER AGREEMENT

At team level construct, the variables of personality, leadership, roles, norms, and cohesiveness were based on the average ratings made by team members. Because of this, it was necessary to determine convergence among the raters on their assessments of the variables mentioned earlier. Estimates were computed using two within-group agreement indices, firstly

the James et al.'s (1984) within-group agreement (r_{wg}) for a multiple item scale used in previous studies by George (1990) and George & Bettenhausen (1990). Secondly, is the Lindell et al.'s (1999) revised interrater agreement for multiple item used in a study by Waldman et al. (2004).

The within-group agreement (r_{wg}) for a multiple item scale is calculated using the following formula by James et al. (1984).

$$r_{wg(J)} = \frac{J\,[1 - (S_{xj}^2 / \sigma_{EU}^2)]}{J[1 - (Sxj^2 / \sigma_{EU}^2)] + (Sxj^2 / \sigma_{EU}^2)}$$

where

J is the number of items in the scale

Sxj^2 is the obtained average variance of the items in the scale, and

σ_{EU}^2 is the variance of the uniform distribution

The revised interrater agreement for multiple item is calculated using the following formula by Lindell et al. (1999).

$$r^*_{wg(J)} = 1 - (Sxj^2 / \sigma_{EU}^2)$$

where

Sxj^2 is the obtained average variance of the items in the scale, and

σ_{EU}^2 is the variance of the uniform distribution

Both of these measures of interrater agreement provide a unique estimate for each group and is interpreted as an indicator of perception convergence within the group (Kozlowski & Hattrup, 1992; Waldman et al.,

2004). In the case of estimates computed using James et al.'s (1984) within-group agreement (r_{wg}) for a multiple item scale, values of 0.7 or higher are necessary to demonstrate homogeneity within each group (George, 1990) and in some instance values of 0.5 or higher are considered as indicating adequate agreement (Bond & Ng, 2004). On the other hand, Lindell et al.'s (1999) revised interrater agreement for multiple item, negative values demonstrate heterogeneity within each group (see A. Cohen, Doveh, & Eick, 2001). Table 6.1 lists the summary of mean and median of $r_{wg(J)}$ and $r^*_{wg(J)}$ for each variable.

Table 6.1

Mean and Median of $r_{wg(J)}$ and $r^*_{wg(J)}$ of the Study Variables

	$r_{wg(J)}$		$r^*_{wg(J)}$	
Variables	**Mean**	**Median**	**Mean**	**Median**
Personality	0.91	0.92	0.61	0.62
Leadership	0.97	0.98	0.83	0.85
Roles	0.90	0.92	0.61	0.62
Norms	0.94	0.96	0.73	0.74
Cohesiveness	0.97	0.97	0.82	0.83

As shown in Table 6.1 the mean value of $r_{wg(J)}$ for personality, leadership, roles, norms, and cohesiveness are 0.91, 0.97, 0.85, 0.94, and 0.97, respectively, while the median values of $r_{wg(J)}$ for personality, leadership, roles, norms, and cohesiveness are 0.92, 0.98, 0.92, 0.96, and 0.97, respectively. While values for personality, leadership, and cohesiveness are greater than 0.7, as roles had 204 of the 212 estimates exceeding 0.70 and norms had 210 of the 212 estimates exceeding 0.70.

The mean of $r^*_{wg(J)}$ for personality, leadership, roles, norms, and cohesiveness are 0.61, 0.84, 0.6, 0.73, and 0.82, respectively. The median

value of $r^*_{wg(J)}$ for personality, leadership, roles, norms, and cohesiveness are 0.62, 0.85, 0.62, 0.74, and 0.83, respectively. All values for personality, leadership, roles, norms, and cohesiveness were positive except for roles. Three teams were found to be revealing negative values for the construct of roles. Hence, the responses for these three teams were not included in the subsequent analyses. In total, both $r_{wg(J)}$ and $r^*_{wg(J)}$ tests provided support for combining personality, leadership, roles, norms, and cohesiveness to produce averaged, aggregated scores of respective teams. Thus, the team level aggregations were made by calculating the team averages.

6.3 CONSTRUCT VALIDITY

Before conducting the main analysis, factor analysis was performed on all items measuring the independent variables and moderating variable. Factor analysis is an established tool that helps to determine the construct adequacy of a measuring device (D. R. Cooper & Schindler, 2003). Factor analysis was conducted with data collected from 212 teams. The purpose of including the entire data collected for the predictive variable in the validity analysis was because these responses did not include any discrepancies that required the data to be excluded.

The total number of usable questionnaires for factor analysis, that is, 212 is greater than the minimum number that have been suggested by Arrindell and Ende (1985), Hair et al. (1998), Meyers et al.(2006), Coakes and Steed (2003), and Bartlett, Kotrlik, and Higgins (2001) for the purpose of conducting factor analysis.

However, the minimum ratio of five subjects per item suggested by Coakes and Steed (2003), Meyers et al.'s (2006) ratio of ten subjects per item, and Hair et al.'s (1998) ratio of twenty subjects per item were not met. In the present study there are 53 items investigated, the sample of 212 is considered less than satisfactory for a single factor analysis to be conducted. Therefore, separate factor analysis was performed for all items measured on an interval scale. Five constructs were tested for validity and reliability namely personality, leadership, roles, norms, and cohesiveness. The following section report and discusses the construct validity of the study variables.

6.3.1 Factor analysis for team level personality construct

Team personality construct dimensions were measured using 23 averaged items responded by team members to represent team-level construct. The items included 10 negatively worded items which were reverse coded. A principle component factor analysis using varimax rotation was then conducted on the 23 items to determine which items should group to form dimensions. Eight items were deleted due to cross loading. The criteria developed by Igbaria et al.'s (1995) was used in the present study for cross loading, that is, a given item should load 0.50 or higher on a specific factor and have a loading no higher than 0.35 on other factors. The final factor analysis was conducted on the remaining fifteen items. The analysis was forced to a four-factor solution based on the earlier dimensions as stated in

Bamber and Castka (2006) with 2 to 6 items loading to each dimension. The results are presented in Table 6.2.

Table 6.2

Summary of Factor Analysis for Team Level Personality Construct

Items	Component			
	1	2	3	4
Factor 1: Unidentified 1				
1. I always get chores done right away.	**.533**	.072	.092	-.065
2. I always like order.	**.513**	.210	.015	.233
3. I am always interested in others.	**.704**	.031	.013	.290
4. I rarely insult people.	**.553**	-.010	-.202	.042
5. I am always the first to start a conversation.	**.615**	.133	.162	-.114
6. I talk to a lot of different people at functions.				
Factor 2: Emotional Stability				
1. I get upset easily.*	.042	**.600**	.209	-.032
2. I change my mood a lot.*	.159	**.788**	.126	.000
3. I have frequent mood swings.*	.089	**.816**	.010	-.012
4. I get irritated easily.*	.076	**.693**	-.045	.067
Factor 3: Extraversion				
1. I don't talk a lot.**	.165	.093	**.765**	-.111
2. I always stay in the background.**	-.033	.015	**.733**	.002
3. I have little to say.**	.115	.161	**.822**	.115
Factor 4: Unidentified 2				
1. I always pay attention to details	-.144	-.022	.091	**.765**
2. I am always interested in other people's problem	.216	.036	-.101	**.756**
Eigenvalue	3.22	1.81	1.63	1.28
Percentage of Variance Explained = 52.95%	21.47	12.08	10.87	8.54
Kaiser-Meyer-Olkin = .69 Bartlett's Test of Sphericity Approx. Chi Square = 622.444; df = 105; Sig = .000				

** Reverse coded item

The output in Table 6.2 shows that, the Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) for the four dimensions solution is 0.69, with a significant Bartlett's Test of Sphericity (Sig=.000). This indicates that the data are suitable for factor analysis (Coakes & Steed, 2003; Hair et al., 1998). The variance is explained by 52.95% with four extracted factors. According to Hair et al. (1998), it is justified for the researcher to instruct the computer to

extract the same number of factors that was previously found. The adapted measure had four dimensions and in this study the researcher had decided to extract the same number of factors based on the previous study. Hair et al. (1998) have also stressed that in social science research it is common to consider a solution that accounts for 60% or in some instances even less, of the total variance as satisfactory. In the present study, factor loading in component met the criteria by Igbaria et al. (1995), that is, a given item should load 0.50 or higher on a specific factor and have a loading no higher than 0.35 on other factors.

The first factor consists of six items and explains 21.47% of the variance in team-level personality construct. The second factor consists of four items and explains 12.08% of the variance in team-level personality construct. The third factor consists of three items and explains 10.87% of the variance in team-level personality construct. The last variable consists of two items and explains 8.54% of the variance in team-level personality construct. The results of the factor analysis provide assurance that the team-level personality construct is meaningful in a theoretical sense.

The adapted personality construct by Bamber and Castka (2006) has suggested to consist of four factors measuring conscientiousness, agreeableness, emotional stability, and extraversion. In the present study, principle component analysis using varimax rotation found general support for this model with minor expectations. The final factor analysis of the team level personality, as illustrated in Table 6.2, shows that the mix up of items occurred in the first factor and the third factors. For instance, the first factor consists of two items each from conscientiousness, agreeableness, and

extraversion. Meanwhile the fourth factor consists of one item each of conscientiousness and agreeableness.

Accordingly, in the present study the first and fourth factor was labeled as undefined 1 and undefined 2. According to Hair et al. (1998) in some instances, it is not possible to assign a name to each of the factors and in such situation the researcher may wish to label the factors derived by that solution as undefined. In addition, Hair et al. (1998) noted that the researcher interprets only those factors that are meaningful and disregards undefined or less meaningful ones. In other words, the factors 1 and 4 were undefinable and the present study only interprets those factors representing meaningful relationships. Thus in the present study two factors were identified as meaningful factors, that is, factor 2 labeled as emotional stability and factor 3 labeled as extraversion. The responses for the items reflective of factor 2 and 3 were summed as an index for each dimension.

6.3.2 Factor analysis for team level leadership construct

As indicated in Table 6.3, to assess the underlying structure of team-level leadership measure, the adapted eight items were submitted to principle component method and varimax rotation. The eight items achieved more than 0.5 communalities and loaded on one factor. The Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) for the single dimension solution is 0.937, with chi-square of Bartlett's test of sphericity 1178.960, the degree of freedom is 28, and is significant at .000. The variance is explained by 69.09% with extracted factors eigenvalue of more than 1. This indicates that the data

are suitable for factor analysis (Coakes & Steed, 2003; Hair et al., 1998; Meyers et al., 2006).

In the present study, principle component analysis using varimax rotation found general support for this model with minor expectations. The original measure consisted of two dimensions but the final factor analysis loads all the items into a single factor. The responses for these eight questions were summed to form an index of leadership.

Table 6.3

Summary of Factor Analysis for Team Level Leadership Construct

	Factor Loading
Leadership Items	1
1. My Ketua Ahli Bomba helps people to make working on their tasks more pleasant.	**.860**
2. My Ketua Ahli Bomba looks out for the personal welfare of group members.	**.861**
3. My Ketua Ahli Bomba does little things to make things pleasant.	**.828**
4. My Ketua Ahli Bomba treats all group members as equals.	**.810**
5. My Ketua Ahli Bomba explains the way tasks should be carried out.	**.882**
6. My Ketua Ahli Bomba decides what and how things shall be done.	**.825**
7. My Ketua Ahli Bomba maintains definite standards of performance.	**.755**
8. My Ketua Ahli Bomba schedules the work to be done.	**.823**
Percentage of Variance Explained (%)	69.09
Kaiser-Meyer-Olkin	.937
Bartlett's Test of Sphericity Approx. Chi Square	1178.960
Df	28
Significant	.000

6.3.3 Factor analysis for team level roles construct

The summary of factor analysis for team-level roles construct was derived upon submitting the adapted six eight items to principle component method and varimax rotation. The output in Table 6.4 shows that, the Kaiser-Meyer-

Olkin measures of sampling adequacy (KMO) for the two dimensions solution is 0.78, with a significant Bartlett's Test of Sphericity (Sig=.000). This indicates that the data are suitable for factor analysis (Coakes & Steed, 2003; Hair et al., 1998; Meyers et al., 2006). The variance is explained by 60.15% with extracted factors eigenvalue of more than 1.

The analysis resulted in two factors being obtained based on the criteria, that is, a given item should load 0.50 or higher on a specific factor and have a loading no higher than 0.35 on other factors (Igbaria et al., 1995). The first factor consists of four items and explains 43.14% of the variance in team-level roles construct. The second factor consists of two items and explains 17.01% of the variance in team-level roles construct. The adapted roles construct by Callero (1985) had suggested to consist of a single factor. In the present study, principle component analysis using varimax rotation found general support for this model with minor expectations. The factor analysis of the team level roles, as illustrated in Table 6.4 shows only two items load into the second factor whilst from item in the first factor. It is noted that in labeling a factor variables with higher loadings are considered more important and have a greater influence on the label selected to represent a factor (Hair et al., 1998). Hair et al. (1998) further stress that the researcher should examine all the underlined variables with higher loadings and should attempt to assign a name or label to a factor that accurately reflects the variables loading on that factor. Therefore, the first factor was deemed to be the best option to be included in conducting further analyses. Accordingly, in the present study the second factor was labeled as undefined 3 and the first factor labeled as roles. Following the suggestion by Hair et al. (1998) that the

researcher interprets only those factors that are meaningful and disregards undefined or less meaningful ones. Thus in the present study only one factor was identified as a meaningful factor, that is, factor 1 labeled as roles. The responses for the items rereflective of factor 1 were summed to form an index of roles.

Table 6.4

Summary of Factor Analysis for Team Level Roles Construct

Items	Component	
	1	2
Factor 1: Roles 1		
1. I always think of my job as a fire fighter and rescuer.	**.745**	.158
2. I really have clear feelings about responding to emergency.	**.760**	.350
3. Fire fighting and rescuing is an important part of who I am.	**.732**	.311
4. I rarely think of my job as a fire fighter and rescuer. **	**.755**	-.165
Factor 2: Unidentified 3		
1. I would feel a loss if I were forced to give up being a fire fighter and rescuer.	.047	**.809**
2. For me, being a fire fighter means more than just fire fighting and rescuing for a living.	.167	**.644**
Eigenvalue	2.59	1.02
Percentage of Variance Explained = 60.15%	43.14	17.01
Kaiser-Meyer-Olkin = .78 Bartlett's Test of Sphericity Approx. Chi Square = 252.336; df = 15; Sig = .000		

** Reverse coded item

6.3.4 Factor analysis for team level norms construct

As indicated in Table 6.5, five items were used to measure norms. The five items attained more than 0.5 anti image correlation and loaded into a single factor. The Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) for the single dimension solution is 0.762, with chi-square of Bartlett's test of sphericity 350.877, the degree of freedom is 10, and is significant at .000.

This indicates that the data are suitable for factor analysis (Coakes & Steed, 2003; Hair et al., 1998; Meyers et al., 2006). The variance is explained by 55.25% with extracted factors eigenvalue of more than 1. Similar to the adapted measure the factor construct found to be unidimensional. The responses for these five questions were summed to form an index of norms.

Table 6.5

Summary of Factor Analysis for Team Level Norms Construct

	Factor Loading
Norms Items	1
1. It is important for us to maintain harmony within our team.	**.521**
2. There is little collaboration among our team members.**	**.708**
3. There is a high level of cooperation between our team members.	**.853**
4. My team members are willing to sacrifice their self interest for the benefit of our team.	**.718**
5. There is a very high level of sharing between our team members.	**.864**
Percentage of Variance Explained (%)	55.25
Kaiser-Meyer-Olkin	.762
Bartlett's Test of Sphericity Approx. Chi Square	350.877
Df	10
Significant	.000

** Reverse coded item

6.3.5 Factor analysis for team level cohesiveness construct

Eleven items were used to measure cohesiveness by the team members. All eleven items comprising measures were adapted from two measures. However, the output of the analysis did not reduce the factor construct into separate dimension. The Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) for the single dimension solution is 0.922, with chi-square of Bartlett's test of sphericity 1248.979, the degree of freedom is 55, and is significant at .000. The variance is explained by 53.41% with extracted

factors eigenvalue of more than 1. The responses for these eleven questions were summed to form an index of cohesiveness. Refer to Table 6.6 for the summary of the analysis.

Table 6.6

Summary of Factor Analysis for Team Level Cohesiveness Construct

	Factor Loading
Cohesiveness Items	1
1. If given a chance, I would choose to leave my team and join another. **	**.500**
2. The members of my team get along very well together.	**.783**
3. The members of my team will readily defend each other from criticism by outsiders.	**.646**
4. I feel that I am really a part of my team.	**.776**
5. I look forward to being with the members of my team each day.	**.605**
6. I find that I generally do not get along with the other members of my team. **	**.556**
7. I enjoy belonging to this team because I am friends to all my team members.	**.803**
8. The team which I belong to is a close one.	**.864**
9. The team was composed of people who fit together.	**.789**
10. I want to remain a member of my team.	**.756**
11. There is a feeling of unity and cohesion in my team.	**.855**
Percentage of Variance Explained (%)	53.41
Kaiser-Meyer-Olkin	.922
Bartlett's Test of Sphericity Approx. Chi Square	1248.979
Df	55
Significant	.000

** Reverse coded item

Overall the result suggests that all the scales used in this study measure the adapted construct distinctively and appropriately. Team-level personality measures were found to be multidimensional, whereas leadership, roles, norms, and cohesiveness were found to be unidimensional.

6.4 RELIABILITY ANALYSIS

Reliability of the measures was re-examined based on the data collected from the responses of the main study. The Cronbach-alpha coefficient was used for each variable and presented in Table 6.7. Internal consistency of the scales range from .72 to .93, which suggest the specified indicators are sufficient for use (Nunnally, 1978). It could be observed that reliabilities of the team structure variables namely leadership, roles, and norms are higher than those of team member resources variables namely emotional stability and extraversion. One plausible explanation could be the fact that team structure variables are shared view by team members whilst team member resources are more individual driven. This could be a possible explanation on the higher internal consistency score obtained.

Table 6.7

Cronbach Alphas for the Study Variables After Factor Analysis

Number of Items	Variables	Alpha
4	Team Average Ratings of Emotional Stability	.72
3	Team Average Ratings of Extraversion	.72
8	Team Average Ratings of Leadership	.93
4	Team Average Ratings of Roles	.76
5	Team Average Ratings of Norms	.79
11	Team Average Ratings of Cohesiveness	.91

6.5 RESPONSE RATE

As earlier mentioned in Chapter 5, the sample size for the current study is 226 teams derived from 81 fire stations from five states in Peninsular Malaysia namely Terengganu, Malacca, Selangor, Federal Territories of Kuala Lumpur, and Penang. The data for independent variables were obtained through self-administered questionnaires to the 226 teams. While the dependent variable data was derived from the secondary data made available through the "Occurrence Book" kept in respective fire station. However, at the end of the data collection period only 212 teams participated. The balance of fourteen teams was not reachable due to several reasons. Teams were not reachable due to their unavailability at the stations for reasons such as attending emergency incidences, having outdoor activities, marching practices, camping at emergency incident sites, and stand-by for events such as free jumps from towers. These fourteen teams were not reachable during the predictor data collection period, which subsequently made the researcher to omit these teams during the criterion data collection period. Therefore, the final data collection period ended with a response from 212 teams comprising of 1579 fire and rescue personnel.

A closer examination on the secondary data on initial emergency response time revealed some "susceptible data". There was a constant one minute or two minutes initial emergency response time recorded for each and every incident that occurred during the 5 months period. Thus, data obtained from 72 teams were excluded from the analysis related to the hypothesis testing. This resulted in 140 matched team member responses and the

team's initial emergency response performance cases. Excluding such data is important because it does not represent the sample (Hair et al., 1998; Meyers et al., 2006).

Finally, fourteen matched cases were excluded due to several missing data per case. The missing cases were only excluded when they were lower than 5% of the total cases (Meyers et al., 2006). However, because there were missing cases for cardiovascular endurance which was more than 5% of the total cases, replacing the mean with missing value analysis (method: mean series) was performed (Meyers et al., 2006). The non availability of cardiovascular endurance was due to unavailability of space to conduct the 2-minute walk test at the respective fire stations. The resulting 126 matched team member responses and the team's initial emergency response performance cases then constituted the sample for this study which gave an effective response rate of 55.8% which covered a broad range of fire fighting teams from the five states. This response rate was considered adequate for the following reasons. Firstly, the data were collected in a self-administered manner, with no prior contact or personal connection made with the fire fighting teams. Secondly, the analysis required the matching of team member responses and the team's weighted initial emergency response time, which led to a lower response rate than actual response rate obtained due to the "susceptible data". Thirdly, the total number of 126 response is greater than Bartlett et al.'s (2001) suggestion that for regression type analysis, the sample size should fall between five and ten times the number of independent variables. The more conservative figure of ten being preferable in order to avoid overfitting (Halinski & Feldt, 1970; Miller & Kunce, 1973).

Given the number of independent variables in this study, which is 6, would suggest a sample size of around 60. Table 6.8 shows the distribution of required and total team available number of responses by states.

Table 6.8

Required and Total Team Available Sample Size

State	Required Number of Teams (n=226)	Total Team Available (n=126)
Terengganu	45	27
Malacca	19	13
Selangor	78	41
Federal Territories of Kuala Lumpur	48	30
Penang	36	15
Total	226	126

6.6 DESCRIPTION OF THE SAMPLE OF STUDY

This section describes the sample of the present study. The sample is described through two main sub-sections namely at individual and team level. The first sub-section of involves the description of the sample at individual level, while the second sub-section details the sample at team level.

6.6.1 Individual Characteristics

This section provides background information of the respondents that participated in the survey. The characteristics examined included marital status, level of education, race, position, age, organizational tenure, team

tenure, experience working under a team leader, weight, height and cardiovascular endurance.

Table 6.9

Description of Sample (Individual Characteristics)

	N	Percentage
Marital Status		
Single	346	22
Married	1211	77
Divorced/Widowed	16	1
Education Level		
Primary	3	0.2
LCE/SRP/PMR	315	20.1
MCE/SPM/SPMV	1192	76
HSC/STPM	48	3
Others	11	0.7
Race		
Malay	1528	97
Chinese	5	0.3
Indian	41	2.6
Others	2	0.1
Designation of Team Members		
Chief Fire Officer (Ketua Pegawai Bomba)	171	11
Senior Fire Officer (Pegawai Bomba Kanan)	165	10.5
Fire Officer KB 17 (Pegawai Bomba)	1226	78.5
Age	M = 35.19	SD = 9.44
Tenure	M = 12.62	SD = 9.29
Experience as Team Members	M = 5.37	SD = 5.49
Experience Working Under a Team Leader	M = 3.06	SD = 3.21
Weight	M = 74.34	SD = 11.85
Height	M = 168.51	SD = 5.34
Distance Walked for Cardiovascular Endurance	M = 141.53	SD = 17.77

Table 6.9 presents background information of the respondents who have participated in the survey. The respondents were fire fighters employed by the Fire and Rescue Department of Malaysia (FRDM). As can be seen in from table 6.9, the majority of the respondents were already married (77%),

having a minimum of MCE/SPM/SPMV qualification (76%), Malay (97%), and were in the position of Fire Officer (Pegawai Bomba) Gred KB 17 (78.5%). With respect to age, on average the respondents were relatively young (mean = 35.19 years old, SD = 9.44), and had been working relatively long time with the Fire and Rescue Department of Malaysia (FRDM) (mean = 12.62 years, SD = 9.29). With respect to the team tenure, on average the respondents had been working relatively long time with the current team (mean = 5.37 years, SD = 5.49), and had been with the supervision of the current team leader relatively long (mean = 3.06 years, SD = 3.21). With regards to the physical ability of the respondents, on average the respondents are relatively not heavy (mean = 74.34kg, SD 11.85), relatively tall (mean = 168.51cm, SD = 5.34), and relatively fit (mean = 141.53, SD = 17.77).

6.6.2 Team Characteristics

This section provides team characteristics background information of the respondents who participated in the survey. The characteristics examined include age, organizational tenure, team tenure, and experience working under a team leader.

Table 6.10

Description of Sample (Team Characteristics)

Variable	Mean	Standard Deviation
Average Age of Team Members	35.44	3.92
Average Tenure of Team Members	12.78	3.92
Average Experience as a Member of a Team	5.38	3.07
Average Experience Working Under a Team Leader	3.13	2.07

Table 6.10 presents background information of the respondents who have participated in the survey. From table 6.10, it is noted that on average the team members were relatively young (mean = 35.44 years old, SD = 3.92), and the team member had been working relatively long time with the Fire and Rescue Department of Malaysia (FRDM) (mean = 12.78 years, SD = 3.92). With respect to the team tenure, on average the team membes had been working relatively long time with the current team (mean = 5.38 years, SD = 3.07), and the team members had been with the supervision of the current team leader relatively long (mean = 3.13 years, SD = 2.07).

6.6 DESCRIPTION OF THE CRITERION VARIABLE

This section provides the background information of the initial emergency response time accounted by the teams that participated in the survey. The characteristics examined include number of incidents, average initial emergency response time, and average weighted initial emergency response time.

6.6.2 Summary of Frequency of Emergency Incidences by State (April-August 2008)

Table 6.11 shows that more than half (52.81%) of the emergency incidences reported occurred from April 2008 till August 2008 in Selangor. This is followed by 15.81% in the Federal Territories of Kuala Lumpur, 13.46% in Penang, 9.06% in Malacca and the remaining 8.86% in Terengganu. Looking at the severity of an incidence which is marked by "Gempar"; red representing the most severe incident followed by yellow which is moderately severe incident, and green the least severe incident. Examples of "Gempar" red incidences are house fires and factory fires while "Gempar" yellow incidences are road traffic accidents and electrical power station fires. The examples of "Gempar" green incidences are forest fires and bush fires. Table 6.11 indicates that incidences occurring in the five states from April 2008 until August 2008 is somewhat evenly distributed. In addition, looking on the distribution of incidences according to the severity revealed that highest occurrence are the moderate severity incidences (37.93%), followed by the most severe incidences (31.70%), and the least severe incidences (30.37%).

Table 6.11

Summary of Frequency of Emergency Incidences by State (April-August 2007)

State	Frequency of Emergency Incidences				
	Gempar				
	Red	Yellow	Green	Total	Percentage
Terengganu	65	118	123	306	8.86
Malacca	67	178	68	313	9.06
Selangor	557	622	645	1824	52.81
Kuala Lumpur	229	222	95	546	15.81
Penang	177	170	118	465	13.46
Total	1095	1310	1049	3454	100
Percentage	31.70	37.93	30.37	100	

6.6.3 Summary of Average and Average Weighted Initial Emergency Response Time by State (April-August 2007)

Table 6.12 provides the average initial emergency response time and average weighted emergency response time. The data reported for the average initial emergency response time indicates that the average initial emergency response time ranges from 78 seconds to 87 seconds during the period of April until August 2007. Teams in Terengganu is appear to respond the fastest by clocking 78 seconds, followed by Selangor clocking 80 seconds, and Malacca, Federal Territories of Kuala Lumpur and Penang having similar response time clocking 87 seconds. The overall average initial emergency response time for the study sample is 84 seconds.

The average weighted initial emergency response time is derived by weighting the frequency of each initial emergency response time with the distance traveled by team members from the waiting room to the fire engine. Weighting the initial emergency response time was done by dividing each

initial emergency response time with the distance from the waiting room to the fire engine. The weighted frequency of each initial emergency response time was then averaged. Based on the average weighted initial emergency response time, teams from Penang emerged as the fastest in responding to initial emergency call by clocking 3.48 seconds per meter, followed by Malacca 3.50 seconds per meter, Terengganu 3.73 seconds per meter, Federal Territories of Kuala Lumpur 3.84 seconds per meter and finally by Selangor 4.02 seconds per meter. The overall average weighted initial emergency response time for the study sample is 3.71 seconds per meter.

Table 6.12

Summary of Average and Average Weighted Initial Emergency Response Time by State (April-August 2007)

States	Average Initial Emergency Response Time	Average Weighted Initial Emergency Response Time
Terengganu	78	3.73
Malacca	87	3.50
Selangor	80	4.02
Kuala Lumpur	87	3.84
Penang	87	3.48
Average	84	3.71

6.7 DESCRIPTIVE ANALYSIS

The general statistical description of variables used in this study is examined by using the descriptive analysis. Statistical values of means, standard deviation, minimum, and maximum were calculated for the independent, and dependent variables of this study. The results of these statistical values are

shown in Table 6.13, Table 6.14, and Table 6.15. The variables were measured on a four point scale except for age, tenure, weight, height, cardiovascular endurance, and initial emergency response time which was measured on a ratio scale.

6.7.2 Team Member Resources

Table 6.13 is a summary of descriptive statistics pertaining to the team member resources variables. The standard deviation for team member cardiovascular endurance is relatively higher than the other ability variables namely weight and height. The smaller standard deviation value indicates that the scores of teams are close to the mean of variables. The mean score of average team member weight is 75.30kg, with a standard deviation of 4.95. The minimum and maximum scores were 63.67kg and 88.93kg respectively. The mean score of average team member height is 168.40cm, with a standard deviation of 2.25 while the minimum and maximum scores were 162.13cm and 173.32cm respectively. Finally, the mean score of average team member cardiovascular endurance ranged from 109.6m to 176.79m, with a mean of 142.50 (SD=11.02).

The descriptive statistics of the personality variables revealed that the mean of team ratings of emotional stability was relatively higher than the mean of team ratings of extraversion. The mean score of team rating of emotional stability is 2.89; with a standard deviation of 0.18, and the mean score of team rating of extraversion is 2.56, with a standard deviation of 0.21.

Table 6.13

Mean, Standard Deviation, Minimum, and Maximum of Team Member Resources Variables

Variables	N	Mean	Standard Deviation	Minimum	Maximum
Team Weight	126	75.30	4.95	63.67	88.93
Team Height	126	168.40	2.25	162.13	173.32
Team Cardiovascular Endurance	126	142.50	11.02	109.6	176.79
Team Ratings of Emotional Stability	126	2.89	.18	2.36	3.44
Team Ratings of Extraversion	126	2.56	.21	2.00	3.08

6.7.3 Team Structure

Table 6.14 shows the team structure descriptive statistics. The mean for team member's tenure diversity is relatively higher than the team member's age diversity. The mean score of age diversity is 0.26, with a standard deviation of 0.06. The minimum and maximum scores were 0.08 and 0.40 respectively. The mean score of tenure diversity is 0.73, with a standard deviation of 0.21 while the minimum and maximum scores were 0.17 and 1.24 respectively.

The descriptive statistics of the variables measured on an interval scale indicated that the mean of team rating of role was relatively higher than the mean of team rating of leadership and norm. The mean score for team rating of role is 3.65; with a standard deviation of 0.16. The mean score for team rating of norm was relatively lower to the mean score for team rating of roles but relatively higher to the mean score for team rating of leadership. The mean score for rating of norm is 3.25, with a standard deviation of 0.20

while the mean score for rating of leadership is 3.17, with a standard deviation of 0.23.

Table 6.14

Mean, Standard Deviation, Minimum, and Maximum of Team Structure Variables

Variables	N	Mean	Standard Deviation	Minimum	Maximum
Team's Age Diversity	126	.26	.06	.08	.40
Team's Tenure Diversity	126	.73	.21	.17	1.24
Team Ratings of Leadership	126	3.17	.23	2.38	3.70
Team Ratings of Roles	126	3.65	.16	3.22	3.97
Team Ratings of Norms	126	3.25	.20	2.74	3.71

6.7.4 Initial Emergency Response Performance

Table 6.15 reveals that the mean score of initial emergency response performance as recorded from the "Occurrence Book" in respective fire stations is 3.71 seconds per meter with a standard deviation of 0.78. The minimum and maximum scores were 1.99 seconds per meter and 5.77 seconds per meter respectively.

Table 6.15

Mean, Standard Deviation, Minimum, and Maximum of Initial Emergency Response Performance

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Weighted Team Initial Emergency Response Time	126	3.71	.78	1.99	5.77

6.8 INTERCORRELATION BETWEEN VARIABLES

A correlation analysis was conducted to explain the relationships among all variables in the study. Pearson correlation was used to examine the correlation coefficient among the variables. Table 6.16 presents the correlation for team member resources meanwhile Table 6.17 presents the correlation for team structure.

6.8.2 Correlation between Team Member Resources and Weighted Initial Emergency Response Time

Table 6.16 presents the correlations between the team member resources and weighted initial emergency response time. The correlation analysis is conducted prior to hypothesis testing in order to determine the extent to which they were related. The correlation analysis was also used to inspect for multicollinearity. When two or more independent variables are highly correlated, the determination of important predictors becomes confused. Multicollinearity increases the variance of regression coefficients and threatens to the validity of the regression equation. The values of Pearson correlations (as presented in table 6.16) shows the relationships between independent variables, and is a method for diagnosing multicollenarity (Allison, 1999; Kennedy, 1985; Meyers et al., 2006). As noted by Cooper and Schindler (2003) and Tsui, Ashford, Clair, & Xin (1995) there is no definitive criterion for the level of correlation that constitute a serious multicollinearity problem. The general rule of thumb is that it should not exceed .75. Similarly,

Kennedy (1985), Allison (1999) and Cooper and Schindler (2003) indicated that correlations of 0.8 or higher are problematic. The highest correlation in the correlation matrix was between emotional stability and extraversion, which was significant at .05 level (r=.20, $p < .05$). Despite the significance of this correlation, the coefficient was not large and would not cause a problem with collinearity (Allison, 1999; D. R. Cooper & Schindler, 2003; Kennedy, 1985).

Moderate level of positive correlation was found for the relation between height and weight, and emotional stability and extraversion, which was significant at .05, level. In the case of the predictor variable, weighted initial emergency response time, high level negative correlation was found with cardiovascular endurance (r=-.30), and high level positive correlation with extraversion (r=.27). The negative relationship indicates that teams with high cardiovascular endurance are more likely to have faster initial emergency response time than teams with lower cardiovascular endurance. Although the correlation between emotional stability and weighted initial emergency response time are in the expected direction, the correlations are not significant. In addition correlation between weight and height with weighted initial emergency response time are not significant.

Table 6.16

Intercorrelation amongst variables (Team Member Resources)

	1	2	3	4	5	6
1. Weight	-					
2. Height	.19*	-				
3. Cardiovascular Endurance	-.06	-.08	-			
4. Emotional Stability	.02	-.04	-.10	-		
5. Extraversion	.08	.13	-.01	.20*	-	
6. Weighted Initial Emergency Response Time	-.16	.13	-.30**	-.01	.27**	-

* Correlation is significant at .05 (2 tailed)
** Correlation is significant at .01 (2 tailed)

6.8.3 Correlation between Team Structure and Weighted Initial Emergency Response Time

Prior to the hypothesis testing, zero-order correlation among the team structure variables and weighted initial emergency response time was conducted. As can be seen in Table 6.17 the highest correlation in the correlation matrix was between age diversity and tenure diversity, which was significant at .001 level (r=.76, $p < .01$) and the correlation coefficient in the output suggest that the coefficient was not large to cause a problem with collinearity (Allison, 1999; D. R. Cooper & Schindler, 2003; Kennedy, 1985).

A positive correlation was found for the relation between age diversity and tenure diversity (r=.76), leadership and norms (r=.57), norms and roles (r=.49), and leadership and roles (r=.43), which was significant at .01 level. Weighted initial emergency response time, is found inversely correlated to norms (r=-.308), which was also significant at .01 level. The negative relationship indicates that teams that demonstrate high norms are more likely to have shorter initial emergency response time than teams with lower norms. Although the correlation amongst leadership and weighted initial emergency response time and roles and weighted initial emergency response time are in the expected direction, the correlations are not significant.

Table 6.17

Intercorrelation amongst variables (Team Structure)

	1	2	3	4	5	6
1. Age Diversity	-					
2. Tenure Diversity	.76**	-				
3. Leadership	-.02	-.03	-			
4. Roles	-.04	.04	.43**	-		
5. Norms	-.01	-.09	.57**	.49**	-	
6. Weighted Initial Emergency Response Time	.05	-.01	-.02	-.05	-.31**	-

* Correlation is significant at .05 (2 tailed)
** Correlation is significant at .01 (2 tailed)

The results of the correlation analysis among the independent variables and dependent variable suggest some support to the hypotheses of this study. Although correlation analysis is reliable, the statistical power is low. A correlation analysis of any magnitude or sign, regardless of its statistical significance, does not imply causation (D. R. Cooper & Schindler, 2003; Zikmund, 2003). In other words, correlation analysis provides no evidence of cause and effect. In addition Cooper and Schindler (2003) stated that even when a coefficient is statistically significant, it must be practically meaningful. In many relationships, other study variables combine to make the coefficient's meaning misleading. In order to investigate the effects of various combinations of and interactions among variables, multivariate statistical analyses must be used. This kind of analyses can be applied when testing a more complex theoretical model. Multiple regression techniques are widely used, versatile and helpful in sorting out confounding effects (D. R. Cooper & Schindler, 2003; Hair et al., 1998). Hence, a multivariate analysis was carried out to test the hypotheses posited in this study.

6.9 RESTATEMENT OF THE STUDY HYPOTHESES

The variation in personality and leadership dimensions as derived from the factor analysis presented earlier requires the hypotheses that concern these dimensions to be restated. The dimensions of personality variable comprising of conscientiousness and agreeableness were excluded. In addition the dimensions of instrumental and supportive leadership were also excluded. New hypotheses for personality factor included emotional stability and

extraversion. Meanwhile both instrumental and supportive leadership dimensions were combined to be a single factor, which is leadership. Other hypotheses still remain as stated in Chapter 5. Regarding the hypothesis for the interacting effect of cohesiveness with leadership (Hypothesis 7b), the dimensions of instrumental and supportive leadership were replaced by a single factor of leadership.

6.9.2 Main Effect

This section restates the hypotheses as derived from the factor analysis presented earlier in this chapter. The following seven hypotheses are concerned with the relationship between team member ratings of team member resources and team structure and initial emergency response performance.

H1: Team ability is negatively related to initial emergency response performance.

H1a: Team weight is positively related to initial emergency response performance.

H1b: Team height is negatively related to initial emergency response performance.

H1c: Team cardiovascular endurance is negatively related to initial emergency response performance.

H2: Team personality is negatively related to initial emergency response performance.

H2a: Team emotional stability is negatively related to initial emergency response performance.

H2b: Team extraversion is positively related to initial emergency response performance.

H3: Team demography is related to initial emergency response performance.

H3a: Team age diversity is positively related to initial emergency response performance.

H3b: Team tenure diversity is negatively related to initial emergency response performance.

H4: Team leadership is negatively related to initial emergency response performance.

H5 Team role is negatively related to initial emergency response performance.

H6: Team norm is negatively related to initial emergency response performance.

6.9.3 Interacting Effect

Similar to the above section, this section also restates the hypotheses as derived from the factor analysis presented earlier in this chapter. The hypotheses are concerned with the moderating effects of cohesiveness on the relationship between team member ratings of team structure and initial emergency response performance.

H7: Cohesiveness moderates the relationship between team structure and initial emergency response performance.

H7a: Cohesiveness moderates the relationship between team demography and initial emergency response performance.

H7a1: Cohesiveness moderates the relationship between age and initial emergency response performance.

H7a2: Cohesiveness moderates the relationship between tenure and initial emergency response performance.

H7b: Cohesiveness moderates the relationship between leadership and initial emergency response performance.

H7c: Cohesiveness moderates the relationship between roles and initial emergency response performance.

H7d: Cohesiveness moderates the relationship between norms and initial emergency response performance.

6.10 RESULTS OF THE MAIN AND INTERACTING EFFECTS

This section is concerned with the testing of hypotheses related to the main effects of team member resources and team structure on initial emergency response performance. As mentioned in Chapter 5, a bivariate correlation was conducted to understand the relationship among team member resources variables, team structure, and initial emergency response performance. In this section a multiple regression to understand the main effect of the team member resources variables and team structure variables on the initial emergency response performance was conducted. Finally a

hierarchical multiple regression was conducted to understand the moderating effects of cohesiveness on the relationship between team structure and initial emergency response performance. In testing the hypothesis developed for this study, the choice of the level of significance was set at $p<.05$ and $p<.01$ (D. R. Cooper & Schindler, 2003; Hair et al., 1998).

To draw accurate conclusions about the regression analysis output and to be able to accurately apply this model to another population of interest, assumptions of linearity, homoscedasticity, independence of the residuals, and normality need to be examined first (Hair et al., 1998). In addition the assumptions of collinearity also need to be met. These assumptions apply to the independent variables, dependent variable, and to the relationship as a whole (Hair et al., 1998) Linearity requires that the relationship between independent and dependent variables is linear. According to Hair et al. (1998), if the analysis of residual does not exhibit any nonlinear pattern to the residuals, it is ensured that the overall equation is linear and can be examined through residual plots. Meanwhile homoscedasticity implies equal variances of the dependent variable at each observation of the independent variable and similarly can be examined through residual plots (Hair et al., 1998). If the examination of residual shows increasing or decreasing residuals, the assumption of homoscedasticity is met. The assumption of normality is met when the residuals fall along the diagonal with no substantial or systematic departures and can be examined from the histogram of the standardized residuals and the Q-Q plots (Hair et al., 1998). The assumption of independent implies that the samples are independent from one another. In this study, the independent assumption

was met because the samples were randomly selected from the population. In addition, Durbin-Watson can be used to test the independence of error terms (Norusis, 1995). The general rule of thumb is, if the Durbin-Watson value is between 1.5 and 2.5, the assumption of independence of the error terms is not violated (Norusis, 1995). Collinearity exists when the ability of an additional independent variable is related not only to its correlation to the dependent variable, but also to the correlation(s) of the additional independent variable to the independent variable(s) already in the regression equation (Hair et al., 1998). Variance inflation factor (VIF) and tolerance statistics are the two statistical methods that can be used to assess collinearity/multicollinearity. It is generally believed that any variance inflation factor (VIF) value exceeds 10 and tolerance value below than .10 indicates a potential problem of multicollinearity (Hair et al., 1998; Myers, 1990).

In this study, evaluation on assumptions of linearity, homoscedasticity, normality, independence of the error terms, and multicollinearity revealed no significant violation of assumption. Appendix 6 does not exhibit any nonlinear pattern to the residuals, thus ensuring that the overall equation is linear. Appendix 7 also shows no pattern of increasing or decreasing residuals, which indicates homoscedasticity in the multivariate case. As shown in the Appendix 7, because the values fall along the diagonal with no substantial or systematic departures, the residuals are considered to represent a normal distribution. The Durbin-Watson value of 1.824 meets the general rule of thumb, and assures the assumptions of independence of the error terms is not violated. Finally the variance inflation factor (VIF) value did not exceed 10 and tolerance value not lower than .10, thus exhibiting no apparent

collinearity problem. The values of Durbin-Watson, variance inflation factor (VIF), and tolerance can be viewed in Appendix 7.

6.10.2 Statistical Test on the Main Effect of Team Member Resources and Team Structure on Initial Emergency Response Performance

To understand the relationship between team member resources, team structure, and initial emergency response performance closely (i.e. hypothesis 1 to hypothesis 6), a multiple regression analysis was conducted.

The multiple correlation (R), squared multiple correlation (R^2) and adjusted squared multiple correlation (R^2_{adj}) indicate how well the combination of independent variables predicts the dependent variable. The results (presented in Appendix 7) showed that the regression equation with all the predictors was significant, $R = .68$, $R^2 = .47$, $R^2_{adj} = .42$, $F\ (10, 115) = 10.14$, $p < .001$. In other words, the multiple correlation coefficient between the predictors and the dependent variable was .68; all these predictors accounted for 46.8% of the variation in the initial emergency response performance. The generalizability of this model in another population was .42. The value of R^2 dropped to only 0.05 (about 5%) in the R^2_{adj} which indicates that the cross validity of this model was fine. The significant F-test revealed that the relationship between the dependent variable and the independent variables was linear and the model significantly predicted the dependent variable.

The F-test [$F\ (10, 115) = 10.135$, $p < .001$], indicate an overall significant prediction in independent variables to the dependent variables, but

it lacks information about the importance of each independent variable. Table 6.18 shows the individual contributor of each predictor is presented by the standardized regression weight for each predictor within a regression equation (Green & Salkind, 2008). Among the ten predictors, norms (β=-.69, t=-7.25, p=. 00) had the highest and significant standardized beta coefficient, which indicates that norm, was the most important variable in predicting the initial emergency response performance. The other important predictor in descending order was extraversion (β=.45, t=5.99, p=.00), leadership (β=.33, t=3.80, p=.00), weight (β=-.30, t=-4.23, p=.00), tenure diversity (β=-.29, t=-2.489, p=.01), age diversity (β=.27, t=2.51, p=.01), and cardiovascular endurance (β=-.23, t=-3.21, p=.00). However, height (β=.12, t=1.69, p=.09), emotional stability (β=-.03, t=-.472, p=.64), and roles (β=.16, t=1.92, p=.06) are not significantly related to initial emergency response performance. Five predictor variables impacted on the dependent variable in the direction hypothesized. Thus, better initial emergency performance can be obtained when teams are composed of members who were lower age diversity, extrovert members and higher tenure diversity, higher cardiovascular endurance, and higher norms. Whilst hypotheses 1c, 2b, 3a, 3b, and 6 are supported, hypotheses 1a, 1b, 2a, 4, and 5 are rejected.

Table 6.18

Results of regression analysis

	Dependent variable Initial Emergency Response Performance
Independent variables	
Weight	-0.300**
Height	0.124
Cardiovascular Endurance	-0.232**
Emotional Stability	-0.034
Extraversion	0.449**
Age Diversity	0.273*
Tenure Diversity	-0.288*
Leadership	0.333**
Roles	0.161
Norms	-0.692**
F value	10.135
R^2	0.468
Adjusted R^2	0.422
Durbin Watson	1.824

* $p<0.05$, ** $p < 0.01$

6.10.3 Interacting Effects of Cohesiveness with Team Structure on Initial Emergency Response

This section presents the results concerning the interacting effects between cohesiveness and team structure variables (age diversity, tenure diversity, leadership, roles, and norms) in predicting initial emergency response performance. To test the extent of which cohesiveness moderates the relationship between team structure variables (age diversity, tenure diversity, leadership, roles, and norms) and initial emergency response performance, a hierarchical multiple regression was carried out. The team structure variables (age diversity, tenure diversity, leadership, roles, and norms) were first

entered into the step 1, followed by the moderator (cohesiveness) into step 2, and the interactions terms in step 3 of the regression model.

Hypothesis 7 predicted that cohesiveness moderates the relationship between team structure variables (age diversity, tenure diversity, leadership, roles, and norms) and initial emergency response performance. Table 6.19 shows the result of the hierarchical multiple regression analysis. The summary and the details (presented in Appendix 8) of the results shows that the standardized coefficients (betas) for each team structure antecedent variables are shown in the respective steps. The set of team structure variables entered at step 1 accounted for approximately 15.2% of the variance in initial emergency response performance. Only leadership (β= .213, t=1.996, p=.05) and norm (β= -.483, t=-4.308, p=.01) had significant main effects on initial emergency response performance. The relationship for leadership was positive but norm was negative. The moderator variable entered at step 2 accounted for approximately 15.4% of the variance in initial emergency response performance. Cohesiveness was not significantly related to initial emergency response performance. At step 3, when the interaction terms were entered, an increase in R^2 by another 7.8% was observed. However, only two interactions were significant, hence, partially support hypothesis 8. The interactions terms are between cohesiveness x age diversity (β= 6.629, t= 2.677, p=.01) and cohesiveness x tenure diversity (β= -5.500, t= -2.289, p=.05). Whilst, hypotheses 7a1 and 7a2 are supported, hypotheses 7b, 7c and 7d are rejected.

Table 6.19

Hierarchical Regression Results Using Cohesiveness as a Moderator in the Relationship between Team Structure Variables and Initial Emergency Response Performance

Independent Variable	Std Beta Step 1	Std Beta Step 2	Std Beta Step 3
Model Variables			
Age Diversity	.253	.254	-6.254*
Tenure Diversity	-.247	-.251	5.223*
Leadership	.213*	.228*	-1.648
Roles	.100	.111	1.775
Norms	-.483**	-.429**	.184
Moderating Variable			
Cohesiveness		-.088	.887
Interaction Terms			
Cohesiveness *Age Diversity			6.629**
Cohesiveness *Tenure Diversity			-5.500*
Cohesiveness *Leadership			3.096
Cohesiveness *Roles			-3.471
Cohesiveness *Norms			-1.231
R^2	.152	.154	.233
Adj R^2	.115	.110	.156
R^2 Change	.152	.003	.078
Sig. F Change	.002	.540	.054
Durbin Watson	1.684	1.684	1.684

*$p < 0.05$, **$p < 0.01$

As indicated in Table 6.19 cohesiveness significantly moderates the relationship between age diversity and initial emergency response performance. Figure 6.1 shows that the relationship between age diversity and initial emergency response performance is strongest in the case of low cohesiveness and weakest in the case of high cohesiveness. Teams of different level of cohesiveness did not differ much in initial emergency response performance under conditions of low age diversity, but large differences were noted under conditions of high age diversity. In other words,

under conditions of high age diversity, teams reporting high levels of cohesiveness reported significantly better initial emergency response performance than teams reporting low levels of cohesiveness.

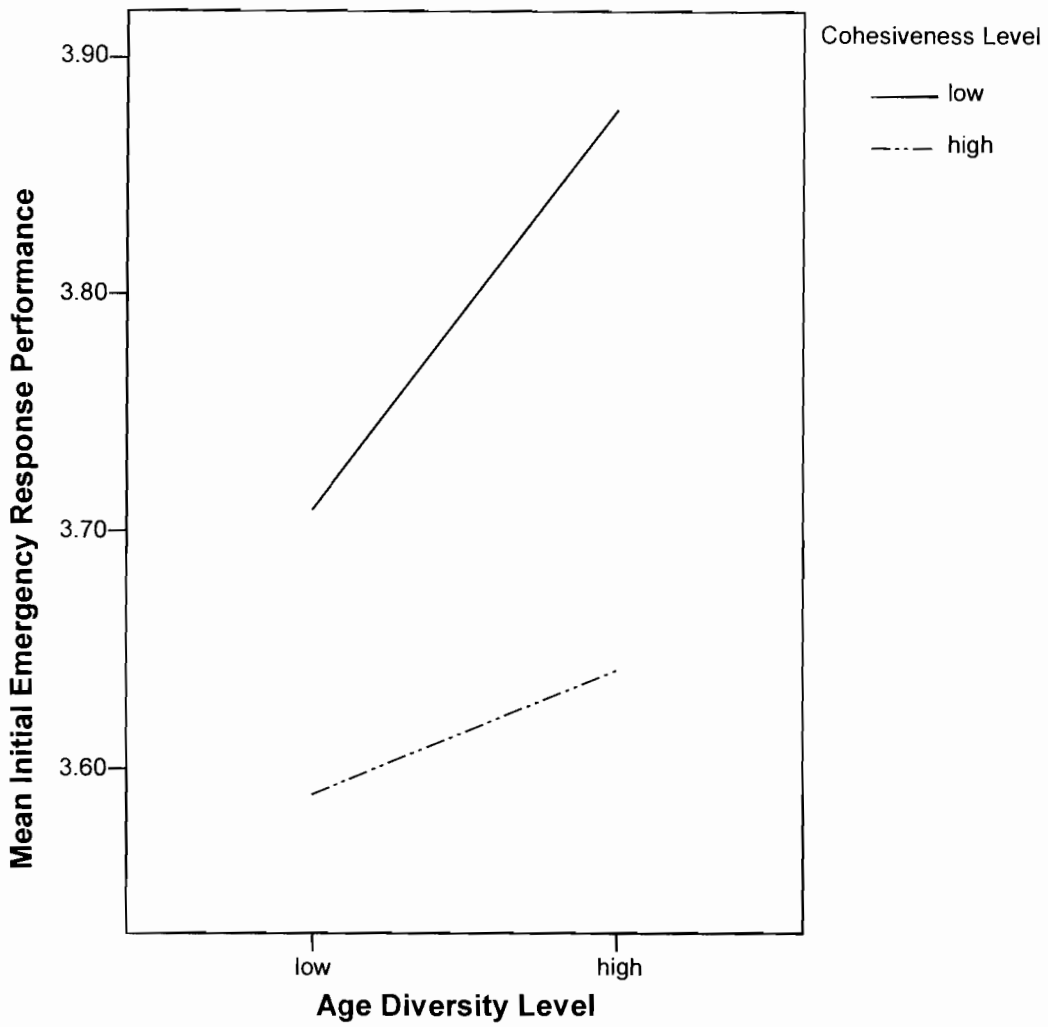

Figure 6.1. Plot of interaction between age diversity and cohesiveness on initial emergency response performance

Similarly, as indicated in Table 6.19 cohesiveness significantly moderates the relationship between tenure diversity and initial emergency response performance. Figure 6.2 shows that the relationship between tenure diversity and initial emergency response performance is strongest in the case of high

cohesiveness and weakest in the case of low cohesiveness. Teams of different level of cohesiveness did not differ much in initial emergency response performance under conditions of low tenure diversity, but large differences were noted under conditions of high tenure diversity. In other words, under conditions of high tenure diversity, teams reporting high levels of cohesiveness reported significantly better initial emergency response performance than teams reporting low levels of cohesiveness.

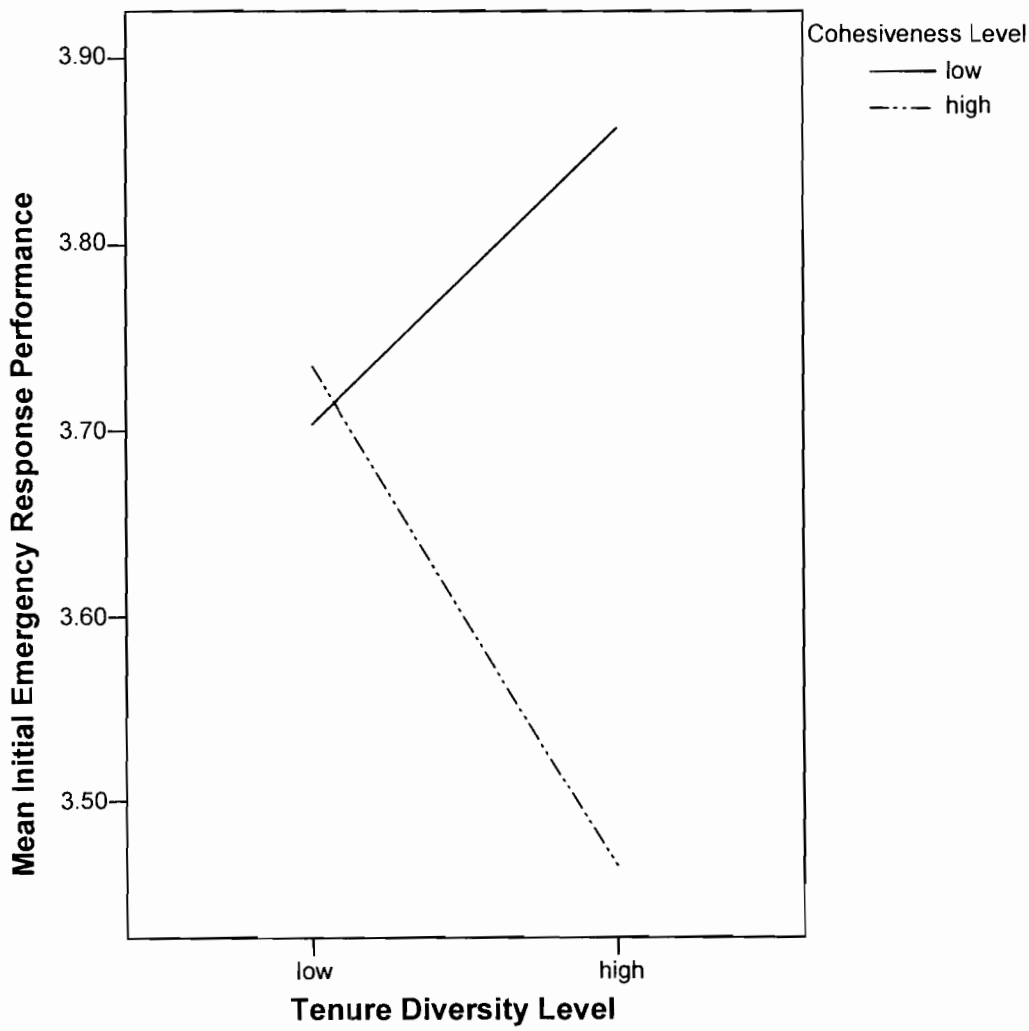

Figure 6.2. Plot of interaction between tenure diversity and cohesiveness on initial emergency response performance

As a summary of the findings, Table 6.20 summarizes the results of the hypotheses tested in this study.

Table 6.20

Summary of Hypothesis Testing

Hypothesis	Statement	Supported / Rejected
H1:	Team ability is negatively related to initial emergency response performance.	Partially Supported
H1a:	Team weight is positively related to initial emergency response performance.	Rejected
H1b:	Team height is negatively related to initial emergency response performance.	Rejected
H1c:	Team cardiovascular endurance is negatively related to initial emergency response performance.	Supported
H2:	Team personality is negatively related to initial emergency response performance.	Partially Supported
H2a:	Team emotional stability is negatively related to initial emergency response performance.	Rejected
H2b:	Team extraversion is positively related to initial emergency response performance.	Supported
H3:	Team demography is related to initial emergency response performance.	Supported
H3a:	Team age diversity is positively related to initial emergency response performance.	Supported
H3b:	Team tenure diversity is negatively related to initial emergency response performance.	Supported
H4:	Team leadership is negatively related to initial emergency response performance.	Rejected
H5:	Team role is negatively related to initial emergency response performance.	Rejected
H6:	Team norm is negatively related to initial emergency response performance.	Supported
H7:	Cohesiveness moderates the relationship between team structure and initial emergency response performance.	Partially Supported
H7a	Cohesiveness moderates the relationship between team demography and initial emergency response performance.	Supported
H7a1:	Cohesiveness moderates the relationship between age and initial emergency response performance.	Supported
H7a2:	Cohesiveness moderates the relationship between tenure and initial emergency response performance.	Supported

Hypothesis	Statement	Supported / Rejected
H7b:	Cohesiveness moderates the relationship between leadership and initial emergency response performance.	Rejected
H7c:	Cohesiveness moderates the relationship between roles and initial emergency response performance.	Rejected
H7d:	Cohesiveness moderates the relationship between norms and initial emergency response performance.	Rejected

6.11 SUMMARY

Generally the interrater agreement provided support for combining personality, leadership, roles, norms, and cohesiveness to produce averaged, aggregated scores of respective teams. While the factors analysis of personality, leadership, roles, norms, and cohesiveness are consistent with the previous studies with some minor modifications. The reliability analysis indicates that the items are reliable and can be computed for further analysis.

The multivariate analysis results revealed that there are some team member resources and team structure variables that help in predicting initial emergency response performance. Cardiovascular endurance, weight, extraversion, age diversity, tenure diversity, leadership, and norms provided support for the propositions that these factors are associated with initial emergency response performance. Specifically, the study found that cardiovascular endurance, tenure diversity, and norms are negatively associated with initial emergency response performance while weight, age diversity, extraversion, and leadership are positively associated with initial emergency response performance. These findings confirm the propositions of field theory. Finally this study found that cohesiveness had a joint effect

with team structure variable (age and tenure) in predicting initial emergency response performance. The following chapter will discuss the findings followed by managerial and theoretical implications, suggestion for future research, limitation, and the conclusion of the present study.

CHAPTER SEVEN

DISCUSSION, IMPLICATIONS AND CONCLUSION

7.1 INTRODUCTION

In the last chapter, the results of the present study have been presented. Out of seven research hypotheses formulated for the study, two are accepted whilst the others are rejected, while three are partially supported. In this chapter attempts will be made to discuss the results found in the context of emergency response. Towards this end, this chapter will be organized as follows: once the discussions on the research questions and hypotheses are made, implications of the research on theory and practice combined with suggestions for future research will be offered. Next, the present research limitations will be highlighted which is followed by the conclusion of the present study.

7.2 DISCUSSION

The main purpose of the present study was to examine the determinants of initial emergency response performance among emergency response teams. Specifically, the study examined the direct relationship of team member resources (i.e. ability and personality) and team structure variables (i.e. team

demography, leadership, roles, and norms) on initial emergency response performance. Towards this end, a number of research hypotheses have been formulated based on the research questions identified. In general, the present study has succeeded in establishing the determinants that contribute to initial emergency response. What follows are discussions on each of the research hypotheses that have been developed for the present study. Specifically, the first part discusses the direct effects of the independent variables (team member resources and team structure) on the dependent variable (initial emergency response performance), while the second part discusses the moderating effect of cohesiveness on the relationship between team structure and initial emergency response performance.

7.2.1 Initial Emergency Response Performance

The first research question is to assess the initial emergency response performance of the fire fighting team during emergencies. To reiterate, the initial emergency response performance was measured by taking recorded measures of time taken once the fire fighting team received a distress call to the dispatch of the fire engine. So based on the data collected the present study has demonstrated that the average initial emergency response performed by fire fighting teams in the selected study sample is 84 seconds, which is apparently better when it is compared to other previous studies that have looked at the time taken to respond to emergency situations in other countries by other emergency responders. For example, Al-Ghamdi (2002) in a study evaluating ambulance rescue time in Riyadh found that the mean

initial emergency response time of ambulance service was 95 seconds. Altintas and Bilir (2001) in a descriptive study to determine various times related to the ambulance activities of Ankara Emergency Aid and Rescue Services (EARS) found that on average the ambulance services clocked 169 seconds for them to initially respond to emergencies. Even though the present study is different from these previous studies on emergency responders that were involved, a valid comparison between these different emergency agencies can be made since there is similarity between the studies in terms of how the initial emergency response was measured. Altintas and Bilir (2001), Al-Ghamdi (2002), and the present study all measured initial emergency as time taken once the fire fighting team received a distress call to the dispatch of the fire engine. Because of the similarities in measurement used of initial emergency response time, direct comparisons of the findings can be made. In this manner it is safe to conclude that the fire fighting teams employed by the Fire and Rescue Department of Malaysia (FRDM) have faster initial emergency response performance. The findings of this study hence provide some evidence to the claims by the Director General of Fire and Rescue Department of Malaysia (FRDM) that the Malaysian fire fighting teams are quick to respond to any emergencies when the fire engine is out of the station within 90 seconds from the moment a distress call is received ("D-G: Firemen leave station 90 seconds after report," 2007). In this context, the finding of the present study is able to provide some assurance and confidence to the general public that fire fighting teams of Fire and Rescue Department of Malaysia (FRDM) are performing at an acceptable level.

Upon a closer examination, in which the contribution of the distance from the waiting room to the fire engine is taken into account, it was revealed that the average weighted initial emergency response performance is 3.71 seconds per meter with a standard deviation of 0.78 seconds per meter. The minimum and maximum weighted initial emergency response times are 1.99 seconds per meter and 5.77 seconds per meter respectively. At the moment the standards for emergency response performance set by Fire and Rescue Department of Malaysia (FRDM) does not take into account the distance fire fighters need to travel from the standby room to the fire engine before the fire engine can be dispatched. In the present study, the distance traveled was taken into consideration. As such a national standard could be established by dividing the standard time with the average distance traveled among the present study sample. The standard initial emergency response time set by Fire and Rescue Department of Malaysia (FRDM) is 90 seconds ("D-G: Firemen leave station 90 seconds after report," 2007) while average traveled distance among the present study sample was 23.14 meters. Therefore, the national weighted initial emergency response time could be set at 3.89 seconds per meter. As such, the present study has demonstrated that the average weighted initial emergency response performed by fire fighting teams in the selected study sample is 3.71 seconds per meter, which is apparently better than the calculated index as noted above. A detailed analysis revealed that the fire fighting teams from Penang has emerged as the fastest team in responding to initial emergency call by clocking in 3.48 seconds per meter, followed by Malacca 3.50 seconds per meter, Terengganu 3.73 seconds per meter, Federal Territories of Kuala Lumpur

3.84 seconds per meter and finally by Selangor 4.02 seconds per meter. It is noted that fire fighting teams from Selangor are the least quick in the initial emergency response because it is composed by the Cyberjaya and Sabak Bernam fire stations. The average distance from the standby room to the fire engine among fire stations in Selangor is 20.55 meters while the distance from the standby room to the fire engine at Cyberjaya and Sabak Bernam fire stations are 39 meters and 34.5 meters respectively. This above average distance needed to travel by the fire fighting teams in Cyberjaya and Sabak Bernam fire stations could have resulted in fire fighting teams in Selangor having the least quick initial emergency response time.

7.2.2 Relationship between Team Member Resources, Team Structure, and Initial Emergency Response Performance

Following the second and third research questions, it was hypothesized that team member resources and team structure influences the initial emergency response performance. As mentioned earlier, team member resources refers to the resources that its team member individually bring to the team (Robbins, 1993) such as ability and personality, while team structure refers to the relationships that determine the allocation of tasks, responsibilities, and authority in a team (Stewart & Barrick, 2000). The results presented in Table 6.18 in the previous chapter provide some support for the hypotheses that both team member resources and team structure are related to initial emergency response performance. The following sections explain the relationships of each variable examined in the present study.

7.2.2.1 Team member ability

In the present study, ability is one of the team member resources studied. Here, ability refers to the task related abilities of the team members (Robbins, 1993) such as weight, height, and cardiovascular endurance. As previously mentioned it is recognized that the job of an emergency responder is a physically demanding occupation (P. O. Davis, Dotson, & Santa Maria, 1982; Gledhill & Jamnik, 1992; Williford et al., 1999) and high level of physical fitness will be an aid to perform their jobs well (Rhea et al., 2004). As such, the choice of the three ability dimensions is valid and accurate portrayal of what are required of fire fighters. The following discusses the results of each of the ability dimensions outlined.

7.2.2.1.1 Weight

In the present study, body weight was found to significantly influence the emergency response team's initial emergency response time. In general the result appears to confirm Robbins's contention that ability is crucial for teams, such as emergency response team, to perform. What is surprising however is that the direction between weight and initial response time was not as hypothesized; instead of showing a negative relationship the result shows otherwise in that a positive relationship between team average body weight and initial emergency response performance was revealed. In other words, the study found that the higher the average body weight of the team, the better its performance in responding initially to emergencies. If one recalls

the literature on this, one would notice that the present finding further contributes to the mixed results obtained in previous empirical efforts. For example, while some researchers found weight to negatively contribute to performance i.e. the lesser the weight the better the performance (e.g. Buchner et al., 1996; Samson et al., 2000; Troosters et al., 1999), others found weight to have no significant influence at all (e.g. Arnason et al., 2004). The present study seems to be consistent with those who found a positive result between weight and performance, such as Williford et al. (1999), who studied fire fighters employed by the Montgomery Fire Department and found that the higher body weight individuals had, the better they performed in simulated fire and rescue exercises.

So what accounts for the findings? Why do teams who have higher body weight perform better? One plausible explanation for such findings may lie in the methods of measuring body weight as suggested by Williford et al. (1999). Based on the literatures they cited, they argued that a body is commonly divided into two components: fat body and fat-free body. While fat body refers to the fatty substances in a body, fat free body refers to the portion of the body remaining after all the fatty substances are extracted (Hodgdon, 1992). Whilst Copay and Charles (1998) argued that excessive fat leads to obesity and is thought that higher percentage of body fat hinders performance in many physical activities, P. O. Davis and Starck (1980) reasoned that some fat in the body is important for normal physiological functioning such as fuel source, insulation and padding. In the context of fire fighters some body fat is therefore crucial for them to perform given their job

are physically demanding (P. O. Davis et al., 1982; Gledhill & Jamnik, 1992; Williford et al., 1999).

Ideally weight should have been measured by determining the proportion of fat in the body. In addition, skinfolds measurement could have also been used as it is the most widely used anthropometric estimation of body size or composition (Plowman & Smith, 1997). However this method requires special training to gain proficiency in measuring that was not possible to obtain for the present study given the time constrain (Hodgdon, 1992). As such, it was decided that anthropometric measurement of weight was instead used because it was relatively easier to carry out and adapted to field conditions (Marriott & Grumstrup-Scott, 1992). Hence in the present study, body weight was simply obtained from each of every team member before it was averaged. Such technique of measuring weight is also the most commonly used for a specific population (Grinker, 1992).

Another possible explanation could be due to the fire fighters daily job roles and responsibility. Specifically, among fire fighters, they frequently train in physical related activities (refer Appendix 1). As mentioned in Chapter 3 fire fighters perform various non-emergency activities during their working hour when there are no emergency occurrences which includes equipment inspection, fire and rescue operation training, fire hydrant inspection, fire engine and pump maintenance, pre-planning activities, and sports. In addition, they are also required to undergo bi-yearly fitness assessments through a 2.4km run. These physical activities are forms of exercise that help to achieve the desirable maintenance of fat free weight (FFW) (Plowman & Smith, 1997; Powers & Howley, 1994). These types of activities could have

an impact on the present results. The frequent training could have resulted the fatter fire fighters to be able to respond faster as Harman and Frykman (1992) reasoned that there are many fatter individuals who can run faster than leaner ones and many lean individuals who do not run as fast as expected. Hence, it may be possible that weight in the present study is composed of body fats necessary for physical functioning. Therefore, it is not totally surprising that the more weight the fire fighting teams have, the better they are in initially responding to emergencies.

7.2.2.1.2 Height

In the present study it was hypothesized that height negatively influences team performance. Unfortunately it was found that body height was not statistically significant in predicting emergency response team's initial performance. The finding obtained in the present study appears to be consistent with other studies that looked into similar issue on team's performance (Arnason et al., 2004). For example, Ostojic (2000) found no relationship between team height and team success among elite Serbian soccer teams. Similarly height did not explain performance at individual level (Wilmore & Haskell, 1972). For example Buchner et al. (1996) found height did not explain the variance in speed among older adults.

One plausible explanation could be due to the nature of the job being performed. To some extent it is noted that height may not necessary play a major role because the job description of fire fighters (as presented in Appendix 9) does not require height to be an essential factor in performing

the job related to initial emergency response. Job descriptions help fire fighters to understand the performance they are expected to achieve (Bohlander, Snell, & Sherman, 2001). These tasks include responding for rescue and extinguishing tasks, and managing emergency calls. One should be able to notice that these tasks and duties do not necessarily require a person to have a certain height requirement.

Another possible reason was in the way performance was measured. In previous studies (e.g. Troosters et al., 1999; Williford et al., 1999) performance was measured on a longer duration, but in this study initial emergency response time was measured within 87 seconds (refer Table 6.12). For example studies that found height to be related to performance measured the latter by a six minute walking distance (Troosters et al., 1999), and a set of physical fitness test (Williford et al., 1999). It is therefore possible that the relationship expected between height and initial emergency performance was not found because of the short duration taken to measure performance (Barrick, Patton, & Haugland, 2000; Tay et al., 2006). This may be simply too short a period of time to observe the height's effect on the initial emergency response performance.

Hence, it may be possible that height in the present study could not manifest its effect on the team's performance and it is also not totally surprising that height may have not necessary play a major role in fire fighters initial response performance based on the job description.

7.2.2.1.3 Cardiovascular endurance

The current study hypothesized that cardiovascular endurance negatively influences initial emergency response performance. Cardiovascular endurance (fitness) refers to the ability of the body to deliver blood and oxygen to the various tissues and organs of the body (Copay & Charles, 1998). The result indicates that cardiovascular endurance was statistically significant in predicting emergency response team's initial performance. It further confirms Robbins's (1993) contention that ability is crucial for teams to perform especially among emergency response teams. The study found an inverse relationship between team average cardiovascular endurance and the initial emergency response performance, hence supporting the hypothesis. In other words, the study found that teams with higher average cardiovascular endurance could perform better than those with lower average cardiovascular endurance. The finding obtained in the current study further validates the earlier works conducted among fire fighters (P. O. Davis & Dotson, 1987; Williford et al., 1999), especially Williford et al.'s (1999) work which found that the higher cardiovascular endurance individuals have better performance i.e. shorter time for forcible entry, hoisting, victim rescue, and stair climb. Such validation of empirical findings is widely accepted and implemented to the workforce as aspects of physical fitness testing have been incorporated as a criteria for job performance of fire fighters (Rafilson, 1995). In addition, Rhea et al. (2004) highlighted that cardiovascular endurance is an important factor and should not be neglected in training for fire fighters.

As noted earlier, fire fighters jobs is a physically demanding occupation (P. O. Davis et al., 1982; Gledhill & Jamnik, 1992; Williford et al., 1999) and high level of physical fitness will be an aid to perform their jobs well (Rhea et al., 2004). Successful job performance has been shown to be dependent on fire fighters' ability to perform strenuous physical activity (Sothmann et al., 1990). Initial response to a distress call is a form of physical activity that needs fire fighters to be physically fit. When certain standards of physical fitness are met, fire fighter's job performance can be improved (P. O. Davis et al., 1982) which is apparent with the current finding. This is why fire fighter keeps on undertaking training on physical related activities during their non-emergency working hours to make sure that they are fit to respond quickly to any emergency calls. The facts that the fire fighting teams in Malaysia are able to respond below 90 seconds ("D-G: Firemen leave station 90 seconds after report," 2007) as required by the Fire and Rescue Department of Malaysia (FRDM) gives some evidence that they are fit to do their job well and that they were in acceptable fitness level.

7.2.2.2 Team member personality

In the present study, personality is the second team member resources examined. Here, team member personality refers to the mix of team member's individual personality, as reflected in team level indexes (Barrick et al., 1998). Personality traits affect team performance by strongly influencing how the individuals will interact with other team members (Robbins, 1993). Due to the interdependent nature of teams and interpersonal demands that

interdependence poses, personality is commonly associated to team performance (Moreland & Levine, 1992). In the present study, initially four dimensions of personality were measured namely conscientiousness, agreeableness, extraversion, and emotional stability. However, due to the variation in personality dimensions as derived from the factor analysis presented in Table 6.2 in Chapter 6, two dimensions were dropped i.e. conscientiousness and agreeableness and further analyses were conducted on the dimensions of emotional stability and extraversion. Hence, the following discusses the personality dimensions of emotional stability and extraversion.

7.2.2.2.1 Emotional stability

In the present study it was hypothesized that emotional stability negatively influences performance. Unfortunately it was found that emotional stability was not statistically significant in predicting initial emergency response performance among fire fighters hence the hypothesis was rejected. The finding obtained in the present study appears to be consistent with other studies that found no significant influence of emotional stability on performance (Barrick et al., 2005; Bolin & Neuman, 2006; Brown et al., 2002; Judge & Erez, 2007; Kichuk & Wiesner, 1997; Morgeson et al., 2005; Tay et al., 2006; Van Vianen & De Dreu, 2001). For example, Neuman et al. (1999) found no relationship between team average emotional stability and team performance among retail employees. In addition, meta analyses examining personality and job performance found that emotional stability has not been a

strong consistent predictor of job performance (Barrick & Mount, 1991). For example, Hurtz and Donovan (2000) in their meta-analysis found that emotional stability to have a low level of criterion related validities in predicting job performance.

One plausible explanation may be due to the nature of fire fighters jobs that has to be devoid of any emotional display for it to be effectively performed (Van Vianen & De Dreu, 2001). For instance, Hurtz and Donovan (2000) in their meta analysis found emotional stability showing rather consistent (although low) levels of criterion validity in particular for jobs involving interpersonal facilitation criteria such as customer service, sales, and perhaps for managerial jobs. In addition a meta analysis by Barrick, Mount, and Judge (2001) found emotional stability to be related to performance in some occupations (police, skilled or semi-skilled) but not to others (managers, sales personnel, or professionals). Even though the job of a fire fighter could be assumed to be somewhat similar to the police, in what both agencies involved in emergencies situations however, their scope of task is significantly different. For example police tasks involve enforcement to assisting the rescue agencies while the fire fighters' indulge into more specific tasks such as performing fire extinguishing, search and rescuing life. Accordingly, in the emotional stability context, when fire fighter hears the alarm, they become "conditioned". Classical conditioning procedures can lead fire fighters to form attitudes towards the alarm without any conscious deliberation about the alarm attributes (Eagly & Chaiken, 1993). As such emotions appear to be nonexistence, once the alarm is heard they response

as quick as possible following the standard response procedure without any argument.

In other words, initial emergency response is simply too short a period of time for emotional stability to be manifested, as contended by (Barrick et al., 2000; Tay et al., 2006) who argued that emotional stability is less relevant in the short duration of performance measurement. In the present study, the duration of performance measurement ranged from 78 seconds to 87 seconds (refer Table 6.12), which is very short for any form of emotions to be displayed. Initial emergency response is not the moment of truth where fire fighters need to be a lot more composed (Hochschild, 1993). For example, on scene emergency response would require fire fighters to be calm, well adjusted, and low in anxiety when emergencies are known to be life threatening.

7.2.2.2.2 Extraversion

The present study hypothesized that extraversion positively influences the fire fighting team's initial emergency response performance. The results indicate that extraversion was statistically significant in predicting initial emergency response time. It further confirms Robbins's (1993) contention that personality is crucial for teams such as fire fighting team, to perform. Specifically, the study found a positive relationship between team average extraversion and initial emergency response performance. In other words, the study found that teams with higher introverts tend to be performing better than those with higher extroverts. Introversion refers to being reserved, quiet,

lethargic, passive, compliant, and unadventurous (Fleeson, Malanos, & Achille, 2002). The current study's finding seem to be consistent with previous scholars who found introverts to be performing better (e.g. Barry & Stewart, 1997; Nguyen et al., 2005). For example, Stewart and Carson (1995) in a study among elite hotel and resort community located in the United States found introverts to be rated with higher annual performance evaluations. In addition, in a meta-analysis study by Hough (1992), he found extraversion to be a negative indicator in future success of combat effectiveness which was defined as survival in combat and reaction to life-threatening situations job performance construct. Accordingly, it appears that within the emergency response context, fire fighting and rescuing job being performed by fire fighters very much involves life-threatening situations. As such, being compliant, reflecting more before acting, and excelling at focusing attention would have an impact on fire fighters job performance because these traits are important for fire fighting teams to handle any emergency situation. As such, fire fighters who are compliant are those that do not argue much and taking orders especially when life-threatening emergencies take place.

Several meta-analysis studies which have been conducted in understanding personality traits on job performance (Barrick & Mount, 1991; Barrick et al., 2001; Hurtz & Donovan, 2000; Mount, Barrick, & Stewart, 1998) found extraversion to be a valid predictor across occupations when interaction with others is a significant portion of the job. Specifically, extraversion is said to be a valid predictor of performance associated with jobs requiring interpersonal interaction and related to the quality of social

interactions (McCrae & Costa, 1989). Individuals who are upbeat, outgoing, and talkative should seemingly have higher performance in settings that require interaction with others. The argument is further strengthened by Barrick and Mount (1991) who reported extraversion as a valid predictor for two occupations involving social interaction, i.e. management (ρ = .18) and sales (ρ = .15). Accordingly, it appears that within the fire fighting team context, introversion is a significant consideration in evaluations of initial response performance because initial response performance does not entail much (if any) interpersonal interaction among team members. During initial emergency response team members individually have to react quickly and speedily and under this circumstances, they do not necessarily have to interact among members because they already know their own specific roles and responsibility during initial emergency response. This makes sense in an initial emergency response context, whereby every task requires fire fighters to be quick and speedy in responding has very minimal (if any) interpersonal interaction among team members.

7.2.2.3 Team demography

In the present study, team demography is one of the team structures investigated. Team demography refers to the degree to which members of a team share a common demographic attributes which is a structure property of a team (Robbins, 1993) such as age and tenure. Team members have different demographic backgrounds; they tend to have different belief structures (i.e. different priorities, background, and ability) based on their

experience (Wiersema & Bantel, 1992). This consequently results in differences in interpretations of tasks and work situations (Waller, Huber, & Glick, 1995; Walsh, 1988). The differences in interpretations tend to manifest in task related discourse in work teams (Bantel & Jackson, 1989). Such discourse can contribute to initial emergency response performance, as the team members strive to reconcile their dissimilar views and abilities on tasks. Hence, the following discusses the demographic factors dimensions of age diversity and tenure diversity.

7.2.2.3.1 Age diversity

The current study hypothesized that age diversity positively influences fire fighting team's initial response performance. Age diversity refers to the degree to which a team is heterogeneous with respect to age (Pelled et al., 1999). The results indicate that age diversity was statistically significant in predicting fire fighting team's initial emergency response performance. Specifically, the study found a positive relationship between team age diversity and fire fighting team's initial response performance hence supporting the hypothesis. In other words, the study found team with lower age diversity to be performing better than those with higher age diversity. In the present study Robbins's (1993) contention that team age diversity is crucial for teams to perform even among emergency response teams is confirmed. The present finding appears to be consistent with previous studies that found teams with lower age diversity to be having better performance (e.g. Leonard et al., 2004; Richard & Shelor, 2002; Simons et al., 1999;

Timmerman, 2000; Wagner et al., 1984) and other behavioral outcomes such as higher intent to remain, innovation, creative behavior, and technical communication frequency (e.g. Bayazit & Mannix, 2003; Choi, 2007; Olson et al., 2006). For example, Ely (2004) found lower age diversity among banking employees in the United States resulted in higher customer referrals. While in a study among engineers and engineering managers in research divisions of medium-sized electronic firms Zenger and Lawrence (1989) witnessed that lower age diversity increased the frequency of employee communication.

The current finding is consistent with the similarity-attraction paradigm (Byrne, 1971; Tziner, 1985) from the field of social psychology. According to this paradigm, Horwitz (2005) stated that homogenous teams are likely to be more productive than heterogeneous teams because of mutual attraction of the team members with similar characteristics. Higher age diversity may result in major differences in belief and value systems (Wagner et al., 1984), which in turn can affect the level of integration within a group. It is further noted that Mannix and Neale (2005) argued that high age diversity could have negative effects on social integration, communication and conflict in groups and this may result in poorer performance due to lowered satisfaction among team members. Moreover, homogeneity in age provides a basis for a shared life history or cohort effect, which creates feelings of camaraderie and comfort in sharing ideas (Choi, 2007). Therefore, lower age diversity among fire fighters would create mutual attraction, which in turn, would result in faster initial response.

As mentioned in Chapter 3 fire fighters are responsible to undertake various fire fighting and rescue tasks which need them to work highly

interdependently amongst other (Cameron, 1994; Cosgrave, 1996; Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995; Klinoff, 2003). Whereby, in fire fighting team context, fire fighters who are homogenous in age have been working together for a long time, as such it develops mutual attraction, social integration, and feelings of camaraderie among members, which would then be translated into achieving lower initial response time. As mentioned earlier, emergencies are known to be a life-threatening situation, it is therefore possible that among fire fighting teams who are composed with lower age diversity, conflict will be minimal at best, while sharing will be emphasized hence enabling the fire fighting team to achieve an optimal initial response time.

7.2.2.3.2 Tenure diversity

In the present study, it was hypothesized that tenure diversity negatively influences team performance. Tenure diversity refers to the degree to which a team is heterogeneous with respect to tenure (Pelled et al., 1999). The results indicate that tenure diversity was statistically significant in predicting emergency response team's initial performance. The finding further confirms Robbins's (1993) contention that tenure diversity is crucial for teams to perform especially among fire fighting teams. The study found a positive relationship between team tenure diversity and initial emergency response performance, hence supporting the hypothesis. In other words, the study found team with higher tenure diversity to be performing better than the teams with lower tenure diversity. The present finding appears to be

consistent with previous scholars who found teams composed of high tenure diversity as having better performance (e.g. Ely, 2004), and other behavioral outcomes such as customer oriented prosocial behavior, emotional conflict, and effective task processes within group (e.g. Pelled et al., 2000; Pelled et al., 1999). For example, Hambrick, Cho, and Chen (1996) found higher tenure diversity among top management teams of airline industry in the United States resulted in higher number of actions a firm launched in a given year and Ancona and Caldwell (1992) revealed that higher tenure diversity among new product teams in high-technology companies to be associated with greater clarity in the team's goals and priorities.

The current finding also appears to be consistent with the cognitive resource diversity theory (Cox & Blake, 1991) in the field of management. The argument of cognitive resource diversity theory is that diversity has a positive impact on performance because of unique cognitive resources that members bring to the team (Cox & Blake, 1991; Hambrick et al., 1996). The underlying assumption of value in diversity is that teams consisting of heterogeneous members are likely to be more productive (Horwitz, 2005) because tenure enables individuals to be exposed to and knowledgeable about different perspective of any job (Ely, 2004). As team members' tenure increases in the organization, they attain a better understanding of policies and procedures (Zenger & Lawrence, 1989), and a better understanding of job-related techniques. Furthermore, heterogeneity in work experience may provide diversity in skill and knowledge required (Pelled et al., 2000). Accordingly, it appears that tenure diversity is a significant consideration in the fire fighting and rescue job context because emergency incidences come

in various forms and sizes such as, in the form of floods, hurricanes, earthquakes, fires, hazardous material, terrorism, and nuclear accidents which are known to be a life-threatening situation and needs to be properly managed because it can result in great loss of life and property (Ford & Schmidt, 2000). Under these circumstances, fire fighting teams need to be composed of individuals with diverse experiences, skills and knowledge to enable the emergency rescue operations to be effective. These experiences and skills are then shared with other team members through social interaction (Bayazit & Mannix, 2003; Ely, 2004) when individuals are placed into a new team as a result of job transfers or promotions.

7.2.2.4 Team leadership

In the present study it was predicted that leadership negatively influences fire fighting team's initial emergency response performance. Here leadership refers to adoption of a leadership style to deal with team members (Ogbonna & Harris, 2000) and in specific, the leader's demonstration of task and relational oriented behavior. In this study, higher leadership ratings means the leader demonstrates high task and relational oriented behavior. In general the result of the present study seems to confirm Robbins's (1993) contention that team leadership style is crucial for teams to perform even among emergency response teams. What is surprising, however, is the direction between team leadership style and initial emergency response performance was not as hypothesized; instead of showing a negative relationship the results shows otherwise in that a positive relationship

between team leadership style and initial emergency response performance was revealed. In other words, the study found that the lower the team leadership style rating, the better the team's performance in responding initially to emergencies.

If one recalls the literature on this, one would notice that the present finding further contributes to the mixed results obtained in previous empirical efforts. For example, while some researchers found team leadership style to negatively contribute to performance i.e. the higher the leadership style rating, the better the performance (e.g. Ammeter & Dukerich, 2002; S. G. Cohen et al., 1997; Kirkman & Rosen, 1999; O'Connell et al., 2002), others found leadership style rating to have no significant influence on performance at all (e.g. Yang, 2008). The present study seems to be consistent with those that found a positive relationship between team leadership style and performance (e.g. Ogbonna & Harris, 2000; Vigoda-Gadot, 2007; Yammarino & Bass, 1990). For example Geyer and Steyrer (1998) found higher leadership style among Austrian bank branches resulted in lower volume savings and loans.

One plausible explanation for the negative influence of leadership style on team performance (i.e. leadership style that is low on task and relationship affects better team performance) could be due to how leadership style was measured. Because leadership style had negative effect on team's initial emergency response, it was expected that the respondents should have rated their team leaders unfavourably. However, they rated their team leaders rather favourably. Why was such favourable perception of their leaders not reflective in the team performance? It could be that the

leadership style items adopted in the present study were general in nature and did not relate specifically to the specific context of the study, i.e. initial emergency response efforts (Hunter, Bedell-Avers, & Mumford, 2007; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In the present study, the statements gauged the level of agreement among members on the leader's task and relational oriented behaviour. If the statements were to be much more specifically related to the context, the respondents may have answered otherwise. In other words, if the statements were tailored to initial emergency response then the ratings could have been different. As such the relationship between leadership style ratings and initial emergency response performance could have resulted as hypothesized (Hunter et al., 2007). If this explanation is plausible, then future researchers who wish to examine the effects of leadership style on team performance need to consider tailoring their instruments as closely as possible to the context of the study.

Higher ratings obtained for team leaders were not surprising because the leaders and the fire fighters have been together for a long period of time and know each other well. Whilst this may be true, it is also speculated that the higher ratings given by team members may be subject to the Hawthorne effect in operation since team members responded to the questionnaires at the presence of their leaders (Prince, 2004). As such, this might have created uneasiness amongst the team members to answer objectively and honestly (D. R. Cooper & Schindler, 2003) and resulted in inflation of their rating on the team leader. This may influence the relationships obtained between leadership style ratings and initial emergency response performance (Podsakoff et al., 2003). If this claim is true, then future research needs to

obtain the data on leadership style from individual team members separately and without the presence of their respective leaders.

Second plausible reason for the negative influence of leadership style on initial emergency response – hence rejecting the hypothesis – may be due to the compounding effects of other independent variables in the multiple regression analysis. To understand the lower the team leadership style rating, the better its performance in responding initially to emergencies, it is necessary first to examine the bivariate correlation between leadership and weighted initial emergency response performance (refer Table 6.16). The correlation indicates that the direction obtained is as hypothesized (r = -.02). However, the correlation is close to zero and not significant. Taken together the mean value of 3.17 and the median value of 3.16 on team leadership style rating, this indicates that team members have rated the leadership style high on a scale from 1 to 4. This high rating on leadership style taking into consideration of the compounding effects of the other independent variables could have resulted in a positive relationship, indicating teams with higher leadership rating style having higher initial emergency response time.

7.2.2.5 Team role

In the present study it was hypothesized that role negatively influences fire fighting team's initial emergency response time. Role in the present study refers to how important the role team members play is viewed as a part of the self (Callero, 1985). Unfortunately, the present study did not find role to be statistically significant in predicting fire fighting team's initial response

performance, thus rejecting the hypothesis formulated. The finding obtained in the present study appears to be consistent with other studies that looked into similar issue on team's performance (Stewart et al., 2005) and other behavioural outcomes (D. E. Benson et al., 1994). For example, Stewart et al. (2005) found teams with high mean level of role among MBA students did not exhibit higher instructors evaluation on team assignment projects.

One plausible explanation for the not significant finding of the influence of role on team initial response could be due to nature of task involved in initial response. In the initial emergency response situation, fire fighting team members upon hearing the emergency notification siren and announcement will quickly put on their appropriate attires and run towards the fire engine. Speed in the initial response is vital to the subsequent response activities and the first few seconds in an emergency is vital (Baldwin, 1994). The fast act of the emergency response personnel will contribute in minimizing death, serious injuries, and property damage (Doyle, 1996; Kelly, 1995; Ramachandran, 1999; Tierney et al., 2001). Accordingly, these reactive behaviours are spontaneous perhaps because fire fighters during the initial response stage have internalized their role, i.e. the self, as a result of consistent and persistent training programs they have to undergo over the years (refer to Chapter Three for a detailed description on this). This makes sense in an initial emergency response context, whereby fire fighters have been "conditioned" to respond quickly and speedy to face and handle cases of emergencies that role is subdued. Classical conditioning procedures can lead fire fighters to form attitudes towards the alarm without any conscious deliberation on the role identity (Eagly & Chaiken, 1993).

Identity theory (Stryker, 1981; Stryker & Serpe, 1982) posits that the self can be conceptualized as a set of identities, which are tied to positions and imbued with shared expectations for social action (Serpe, 1987). Consistent with this theory, it is reasonable to predict that perhaps many other identities such as being a father, brother, son or breadwinner of the family are more important to fire fighters than that of being a fire and rescue officer; that is, these other, more important identities, would be more influential than the identity of fire and rescue officer in directing the team performance. In addition, identity theory emphasizes that the relationships between self, society (social structure) and role performance where the probability of selecting a particular identity as the basis for role performance reflect that identity's location in the salience hierarchy. Indeed, congruent with Stryker's (1968) argument that the identities comprising the self are arranged, in hierarchal order, from the most to the least important, it could be argued that why the role of being a fire and rescue officer is not a very salient role is perhaps because the they identify themselves more of being someone else, such as being a father, brother, son or breadwinner of the family, than being a fire fighter.

Another possible explanation that could help illuminate the no significant finding of role influence on team performance may relate to social desirability bias. Firstly, the pressures, leading to an unwillingness to admit to not having acted in a socially approved manner, can affect the reporting stage (Presser & Stinson, 1998). There would be a possibility that the role identity reported by fire fighting team members were merely based on socially acceptable ones. Zerbe and Paulhus (1987) defined social

desirability bias as a tendency of individuals to deny socially undesirable traits or behaviours and to admit socially desirable ones. With respect to the items asked in the questionnaires, there was possibility that fire fighting team members would not want to respond that the role they play as fire and rescue officers was not as a part of themselves because this would be seen as socially undesirable; as a result, they provided responses that were socially desirable. Secondly, the social desirability bias is more vulnerable when responses are made directly to the researcher (Tourangeau & Smith, 1996). In the present study data collection was conducted in a self-administered manner that required fire fighting team members to respond directly to the researcher. This also could be a possible explanation for the social desirability bias to take place. Thirdly, the social desirability bias could arise due to cultural differences. In an individualistic society, people prefer having a job which allows them extra time for personal and family life, provides a personal sense of accomplishment, and gives them freedom to adopt their own approach in performing the job tasks (Hofstede, 1984). In a collectivist country, by contrast, social norms are more important to people and there is greater pressure on individuals to conform to those norms (Noriyuki, 1985). In addition, Randall, Huo, and Pawelk (1993) stressed that employees in individualistic countries, such as Great Britain and the U.S. are more inner-directed, whereas in collectivist countries, such as those in the Asia Pacific region, individuals are more outer directed. Therefore, the values of individualism/collectivism may be reflected in social desirability bias while responding to self-reported questionnaire. In the present study, the items constructed to investigate role identity asked if fire fighters have engaged in

certain behaviours. These response choices given would involve putting the welfare of their in-group (fire fighting team members) above that of their out-group. The response influenced by social desirability bias can provide a false correlation between independent and dependent variables such as a spurious effect (Ganster, Hennessey, & Luthans, 1983; Podsakoff et al., 2003). As such, this could explain the statistically no significant relationship between team member role and initial emergency response performance. If social desirability bias did indeed have taken place, then future studies should consider such effect and attempt to minimize such bias.

The last plausible explanation for the no significant relationship between role and initial emergency response performance of fire fighting teams may be due to the fact that the relationship between the variables is more complex (i.e. not linear) as one could imagine (Kichuk & Wiesner, 1997). The effects of role on initial emergency response performance may also depend on the combination of the team members' ratings on role, although a regression equation entering the average of the teams' rating on role scores as a function of initial emergency response performance showed no significant relationship. Taking the average value for the role composite would have resulted in overstating the true values in the team member responses. This could have resulted in the high average ratings for role. Moreover, there is possibility that a team will perform better when role is measured by the dispersion of ratings of its members where each member contributes unique attributes to the team. The assumption could be true as there are studies that found role to be related to outcomes when conducted at the individual level (Callero, 1985; Callero et al., 1987; Charng et al., 1988;

Gargano et al., 2004; Granberg & Holmberg, 1990; L. Lee et al., 1999; Sparks & Shepherd, 1992). In addition the possibility of understanding the rating dispersion of role among team members is an important aspect to be investigated following the empirical finding by Stewart et al. (2005). In their study role dispersion was found to be related to task performance among teams of MBA students. Hence, future efforts should be directed at examining the relationship between role dispersion and initial emergency response.

7.2.2.6 Team norm

The current study has hypothesized that cooperative norm negatively influences initial emergency response performance. Norm refers to the behavior patterns that are relatively stable and expected by group members (Bettenhausen & Murnighan, 1991). In the present study, the investigation was on the cooperative norms among members, which reflect the degree of importance fire fighting team members place on their shared pursuits, shared objectives, and mutual interest to achieve mutual goals (Chatman & Flynn, 2001). Cooperative norm is a valid and accurate portrayal of what is required of fire fighters because their tasks involves high interdependency (Cameron, 1994; Cosgrave, 1996; Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995; Klinoff, 2003). The result of the present study indicates that cooperative norm was statistically significant in predicting emergency response team's initial performance. The results of the present study further confirmed Robbins's contention that norm is crucial for teams to perform even among emergency

response teams. The study found an inverse relationship between team average cooperative norm and initial emergency response performance, hence supporting the hypothesis. In other words, the study found that teams with higher cooperative norm to be performing better than those with lower cooperative norm. The findings obtained in the current study further validate earlier works that examined the effect of norms on performance (e.g. Cai & Yang, 2008; Chatman & Flynn, 2001; Gellatly, 1995; Janicik & Bartel, 2003; Langerak, 2001) and other outcome measures such as helping behavior, problem solving efficacy, counterproductive behavior, withdrawal behavior, self-efficacy, and commitment (e.g. C. L. Jackson et al., 2006; Kasouf et al., 2006; Siguaw et al., 1998). For example, Janicik and Bartel (2003) found higher time awareness norm among undergraduate project groups in a university to be related to higher evaluation on quality and standards of project groups written report.

Siguaw et al. (1998) noted that with cooperative norm, members will collaborate with each other to achieve common goals. On the basis of this argument, Ng and Dyne (2005) reiterated that cooperative norm may have the most direct link to helping behavior because they establish that behavioral expectation specifically encourages cooperation. In reviewing team performance, Katzenbach and Smith (1993; 2005) found that cooperative teams perform superior to the sum of the members' individual best efforts which occur as a result of synergistic gain through cooperation. Conversely, it is argued that groups with weak cooperative norm tend to emphasize independence rather than cooperation (Ng & Dyne, 2005). Accordingly, it appears that cooperative norm is a significant consideration in

fire fighting and rescue job context because high level of interdependence is vital for emergency response performance (Cameron, 1994; Cosgrave, 1996; Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995; Klinoff, 2003; Salas et al., 1992). Under these circumstances, fire fighters are required to collaborate with each other to create helping behavior, which encourages cooperation among members. Therefore the presence of higher cooperative norm should be facilitative in encouraging cooperation among fire fighting team members to achieve the synergistic gain, which would result having quicker initial response time. In addition, Cannon, Achrol, and Gundlach (2000) view that norms could provide a general framework of reference, order, and standards against which to guide and assess appropriate behavior in uncertain and ambiguous situations and thus are able to enhance the fire fighting team's performance. Heide and John (1992) further argued that the existence of norms could serve as a general protective device against deviant and opportunistic behavior which could result in dysfunctional conflict which can negatively affect performance. The presence of norms among fire fighting team members should prevent opportunistic behaviors, which in turn could make the teams feel comfortable in developing various structure and communication mechanism that could enhance their initial emergency response performance (Cai, Jun, & Yang, 2006; Mohr & Sohi, 1995).

7.2.3 Interacting Effects

Following the fourth research question, it was generally hypothesized that cohesiveness moderates the relationship between team structure variables

such as team demography, leadership, role, and norm and initial emergency response performance. Cohesiveness refers to the extent to which group members feel a part of the group and their desire to remain in the group (Dobbins & Zaccaro, 1986; Rosenfeld & Gilbert, 1989). The result presented in Table 6.19 in the previous chapter provides some support for all the hypotheses developed that cohesiveness moderates the relationship between team structure variables and initial emergency response performance. Although intuitively appealing, to date, no study has assessed the possible moderating role of cohesiveness in the team structure variables – performance relationship specifically in the present study is the initial emergency response performance. Moreover, studies that had examined cohesiveness as a moderator between task characteristics and individual performance (Dailey, 1978), leader behavior and subordinate role clarity, satisfaction with leader and self-rated performance (Schriesheim, 1980), leader behavior and job satisfaction (Dobbins & Zaccaro, 1986), organizational stress and individual strain (Beehr, 1976), and leadership and perceptions of unit performance and commitment (Pillai & Williams, 2004) relationship. These studies were similar to one another because the dependent variable was measured at the individual level. On the other hand, the present study measured the dependent variable at the group level, hence, making it different. As such, the findings of this present study are preliminary and, hence should be interpreted with some caution. In the current study, two moderating effects were found i.e. cohesiveness moderates the relationship between (1) age diversity (2) tenure diversity and initial emergency response performance. The following section explains the

moderating effect of cohesiveness on the relationship between team structure variables and initial emergency response performance examined in the present study.

7.2.3.1 Interacting effects of cohesiveness with team structure on initial emergency response performance

In the present study, it was hypothesized that cohesiveness moderates the relationship between team structure variables such as team demography, leadership, role, and norm and initial emergency response performance. The result indicates that cohesiveness was statistically significant in moderating the relationship between team structure variables and initial emergency response performance. As indicated in Table 6.19, of the five interaction terms involving the use of the graphical method and split model regression it was revealed that the interactions between: (1) age diversity x cohesiveness were stronger among low cohesive teams and (2) tenure diversity x cohesiveness were stronger among high cohesive teams. In other words, under conditions of high age diversity and tenure diversity, teams reporting high levels of cohesiveness reported significantly better initial emergency response performance than teams reporting low levels of cohesiveness. The finding obtained in the present study appears to be consistent with other scholars who found cohesiveness to be having a moderating effect (e.g. Beehr, 1976; Dobbins & Zaccaro, 1986; Schriesheim, 1980). For example, Dailey (1978) conducted a study among scientists and engineers representing public and private R&D organizations and found cohesiveness

to moderate the relationship between task difficulty and individual performance.

The above findings are consistent with the notion that cohesiveness is the resultant force that acts on members to remain in the group (Festinger, 1950). It is considered an essential component of the team's overall social integration, or the attraction to the team, satisfaction with other members of the team, and social interaction among the team members (O'Reilly et al., 1989), which results in behavior modification. In addition, the finding of the present study validates Kurt Lewin's field theory, which demonstrates that human behavior is the product not simply of personal characteristics, instincts, and other forces within members but also of complex, dynamic environment the team members inhabit. Relevant to team dynamics, Lewin (1958) postulated that team behavior is a complicated set of interactions and forces that affect team structure, while situated learning theory (Lave, 1988) posits that learning is unintentional and situated within authentic activity, context, and culture; as such it implies that team cohesion should strengthen when a collection of individuals work together in the pursuit of common goals, interact socially, develop relations and understanding, and learn together in the process. Accordingly, it appears that team cohesiveness is a significant consideration in the fire fighting team context because team method of job design requires individuals to interact at varying degree of interdependency to achieve shared outcome (Salas et al., 1992). Especially in the emergency response context, fire fighting job needs high emphasis on interdependence among members to minimize the impact of an emergency (Cameron, 1994; Cosgrave, 1996; Doyle, 1996; Ford & Schmidt, 2000; Kelly, 1995; Klinoff,

2003). As such, cohesiveness among fire fighting team members acts as catalyst to foster overall social integration, or the attraction to the team, satisfaction with other members of the team, and social interaction among the team members which results in behavior modification in the pursuit of achieving better initial response time. The following will discuss the moderating effect of cohesiveness on the relationship between (1) age diversity (2) tenure diversity and initial emergency response performance.

7.2.3.1.1 Interacting effects of cohesiveness with age diversity on initial emergency response performance

As mentioned in Chapter 7, Figure 6.1 indicates that under conditions of high age diversity, teams reporting high levels of cohesiveness reported significantly better initial emergency response performance than teams reporting low levels of cohesiveness. Higher age diversity in teams have been reported to hinder mutual attraction (Horwitz, 2005), resulting in major differences in belief and value systems (Wagner et al., 1984), and having negative effects on social integration, communication and conflict in groups (Mannix & Neale, 2005), while cohesiveness is known to be important for team's social integration, attraction to the team, satisfaction with other members, and social interaction among members in the pursuit of common goals (Lave, 1988; O'Reilly et al., 1989). As mentioned in Chapter 3, frequent training exercises such as fire and rescue operation training, fire hydrant inspection, fire engine and pump maintenance, pre-planning activities, and sports encourage team members to work together and build mutual trust,

which could increase team coordination and contribute to cohesion building in fire fighting teams (Milgram, Orenstein, & Zafrir, 1989). In addition, the standby and routine tasks period allows more time for fire fighting team to become more cohesive through teamwork activities (B. Lee, 2004). For example, Bartone, Johnsen, Eid, Brun, and Laberg (2002) conducted a study among cadets at the Royal Norwegian Naval Academy (RnoNA) found time spent together among cadets increases in cohesion in military units. The present study finding raises the possibility that cohesiveness may reduce the negative effects caused by high age diversity in fire fighting teams. For example, studies conducted in military organizations found cohesiveness to improve morale and reduce negative reactions among team members (Griffith, 1989; Milgram et al., 1989). In addition, cohesiveness has been identified as a important factor to absorb the impact of stressors and their adverse consequences within a team (Shils & Janowitz, 1948). Accordingly, it appears that cohesiveness is a significant consideration in fire fighting team context because teams composed with high age diversity would be experiencing negative effects in teams. Under these circumstances, fire fighting teams which report high level of cohesiveness would be able to absorb these stressors and their adverse consequences caused by the differences in belief and value systems. As such, teams composed of high age diversity and enhanced levels of cohesiveness will be reporting better initial emergency response time.

7.2.3.1.2 Interacting effects of cohesiveness with tenure diversity on initial emergency response performance

The second moderated relationship by cohesiveness is between tenure diversity and initial emergency response performance. As indicated in Figure 6.2, under conditions of high tenure diversity, teams reporting high levels of cohesiveness reported significantly better initial emergency response performance than teams reporting low levels of cohesiveness. Higher tenure diversity in teams have been reported to bring unique cognitive resources to the team such as exposure and knowledge (Cox & Blake, 1991; Ely, 2004; Hambrick et al., 1996; Pelled et al., 2000) and better understanding of policies and procedures (Zenger & Lawrence, 1989). As mentioned above, cohesiveness is known to have positive effects on teams (Lave, 1988; O'Reilly et al., 1989). Similar to what have been mentioned above, frequent team training exercises and activities during standby and routine tasks period facilitate the development of cohesiveness in fire fighting teams (Bartone et al., 2002; B. Lee, 2004; Milgram et al., 1989). As such, the present study finding raises the possibility that cohesiveness may foster sharing of resources brought to the fire fighting team as a result of high tenure diversity in teams. For example, Kidwell et al. (1997) conducted a study among work groups in service sector and found employees in high cohesive work groups engaged in higher helping behavior among co-workers. In addition, their study suggested that work group cohesiveness might serve to establish a context favorable for exchanges among group members. Accordingly, it appears that cohesiveness is a significant consideration in fire fighting team

context because teams composed of high tenure diversity would enrich members with diverse resources such as knowledge, skills, abilities, and experience. Under these circumstances, fire fighting teams which report high level of cohesiveness would exchange and share the unique resources required for emergency response work (Pelled et al., 2000) through social interaction (Bayazit & Mannix, 2003; Ely, 2004). Thus, teams composed of high tenure diversity and enhanced levels of cohesiveness will be reporting better initial emergency response time.

Based on the above piece of evidence, it is reasonable to argue that cohesiveness contributes as an enhancer for superior team performance. As such, Officer in-Charge of a fire station must make special efforts to enhance fire fighting team cohesion, and the management of Fire and Rescue Department of Malaysia (FRDM) should develop more fire fighting-specific training programmes and activities during standby and routine tasks period that involve the entire team so that they facilitate cohesion building in fire fighting teams (B. Lee, 2004; Milgram et al., 1989). Time spent together is one potential determinant of team cohesion, but cohesion will not occur automatically (Bartone et al., 2002; Manning, 1991). Therefore, management support is viewed vital in fostering cohesiveness in fire fighting team, as this could enhance the responding performance. Knowing the fact that emergencies occur in various forms and sizes (Ford & Schmidt, 2000) and under highly stressful conditions (Williford et al., 1999), high interdependence is needed amongst fire fighters (Cameron, 1994; Cosgrave, 1996; Doyle, 1996; Kelly, 1995; Klinoff, 2003); as such the presence of cohesiveness in fire fighting teams would foster the emergency response activities. Whilst

such explanation may be plausible and valid, this remains speculative at best. Future research needs to be carried out to examine this plausibility scientifically.

7.3 IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

In the above sections, the results of the present study have been discussed based on the research questions and hypotheses. The findings from this study have several important implications both to practice and theory. The first section will discuss the managerial implications while the second section will detail the theoretical implications combined with several suggestions for future research.

7.3.1 Managerial Implications

The current study found weight, cardiovascular endurance, extraversion, age diversity, tenure diversity, and norms to be associated with initial emergency performance. As such, the present findings have some contribution towards human resource management activities such as recruitment, selection, training, and team composition. Firstly, the findings of team member resources variables and team structure variables that are associated with fire fighting team's initial performance have implications on recruitment and selection process. Recruitment is defined as organizational activities that influence the number and types of applicants who apply for a job whether the applicants accept the jobs that are offered (Breaugh, 1992), while selection is

defined as the process of reducing by choosing from among those applicants who have the relevant qualifications to fill jobs in an organization (Bohlander et al., 2001; Mathis & Jackson, 2003). In the present study cooperative norms and cohesiveness have emerged as significant predictors of team's initial response, which results from the ability of fire fighters to work as a team (Chatman & Flynn, 2001; O'Reilly et al., 1989; Siguaw et al., 1998). As such, the current findings have highlighted the need to incorporate the requirement of ability to work in teams in the job specification of fire fighters. Secondly, the personality variable of extraversion was found to be associated with lower initial response performance. Furthermore, there are evidence that previous studies have found personality test to be helping employers do to a better job of screening (e.g. Bates, 2002; Caligiuri, 2000; Niehoff & Paul, 2000; Sarchione, Cuttler, Muchinsky, & Nelson-Gray, 1998). As such, selection tests could be in assistance to identify potential individuals as well as to select and place the right person for the fire fighting job (Bohlander et al., 2001). Therefore, in the future Fire and Rescue Department of Malaysia (FRDM) could include employment test to assess the ability to work in teams and suitable personality traits as an additional criterion for recruitment and selection considerations.

The present study finding has also some implications on the training activities conducted by the Fire and Rescue Department of Malaysia (FRDM). Training is defined as a systematic process of attempting to develop knowledge, skill, and ability for current or future jobs (Blanchard & Thacker, 1999). The current findings indicate that cardiovascular endurance, norms, and cohesiveness to be influencing initial emergency performance.

Increasing the frequency of cardiovascular endurance test would enable the fire fighters to maintain the physical fitness state while designing training modules instilling cooperative norms and cohesiveness among fire fighting team members would increase team's overall social integration and social interaction (O'Reilly et al., 1989), which in turn may improve the initial response performance. Previous studies have suggested that such training programs are a critical determinant of team performance, particularly under conditions of high workload and high stress in which fire fighting teams generally must operate (e.g. Cannon-Bowers, Salas, & Converse, 1993). However, in the present study the impact of training on initial emergency response performance was not examined; hence future studies need to be directed at understanding this relationship.

Finally, the present study has also contributed to the fire fighting team composition. Team composition refers to the degree to which members of a team share or diverse a common demographic attributes, skills, and knowledge (Robbins, 1993). Organizations nowadays are increasingly integrating the diverse background of members within work team structures (Horwitz, 2005) which is becoming a growing practice in modern organizations (Cox & Blake, 1991; Lawrence, 1997). The management of Fire and Rescue Department of Malaysia should consider the diversity in terms of age and tenure among fire fighting teams as emphasis is placed on teamwork. Simply creating diverse teams will not make them more effective; rather the success of teamwork is largely dependent on the right composition of individual attributes (Horwitz, 2005). In addition, different forms of diversity cannot be managed in the same manner, so a contingency approach to

managing diversity is warranted (Rodriguez, 1998). For example, the current findings suggest that lower age diversity and higher tenure diversity is associated with higher team's initial emergency response performance. Therefore, there is a need to develop policies and programs allowing for and valuing the unique characteristics among diverse teams (Cady & Valentine, 1999). Although the present study does not facilitate specific recommendation based on its findings, this could encourage the management of Fire and Rescue Department of Malaysia (FRDM) to view and indulge into new and creative methods for managing diversity. Although the current results are promising when examining the impacts of team composition on team's initial emergency performance, future research is required to further validate their application.

In summary, the results of this investigation also point to the need for developing team dynamics, possibly through a structured intervention designed to bring about a positive change in team performance in order to meet one of the critical challenges of the 21st century.

7.3.2 Theoretical Implications

Findings from the main and interacting effects of the present study have extended beyond findings from other previous studies and thus have contributed new information to the body of knowledge in emergency response research. Firstly, the group behavior model proposed by Robbins (1993), substantially based on the previous scholars (e.g. Bushe & Johnson, 1989; Goodman et al., 1987; Hackman, 1987) has depicted that team itself

has a distinct set of resources determined by its membership and also has an internal structure that defines member roles and norms that determines team performance, while the theoretical justification of field theory (Lewin, 1951) postulated that the team member and the team member's environment has to be considered as one constellation of interdependent factors to predict and understand the team behavior. In addition, relevant to team dynamics, Lewin (1958) argued that team behavior is a complicated set of interactions and forces that not only affect team structures, but also modify individual behavior. The present study suggest that the relationship between team member resources, team structure, and team performance as suggested by Robbins (1993) and its underlying theoretical justification of field theory (Lewin, 1951) should be extended to various team based research. Previous scholars have heavily investigated these relationships in the Western context (e.g. Barrick et al., 1998; Halfhill et al., 2005; O'Connell et al., 2002; Timmerman, 2000). For example, Chatman and Flynn (2001), in a study among full-time students at a major American university found higher cooperative team norms to be related to higher team accomplishment of consulting projects. In addition, the relationship between team member resources, team structure, and team performance was also heavily focused in business and management research (e.g. Kirkman & Rosen, 1999; Morgeson et al., 2005; Zenger & Lawrence, 1989). For example, Ely (2004) found higher tenure diversity to be related to higher customer referrals among retail branches of the bank retail branches located primarily in and around a large city in the northeastern United States. As such, the present findings further validate the application of group behavior model and the

justification of field theory when applied to non-western teams such as the Malaysian Fire and Rescue Department's fire fighting teams and nonprofit oriented teams context such as emergency response teams. Therefore, future research is necessary to expand and replicate the model to non-Western context and to other nonprofit oriented teams such as the police, medical services, and social organizations, which would help in the validation process. Though it was clear that the findings of this study have important implications for fire fighter's initial emergency response performance, what is still unclear is whether the effects of team behavior on initial emergency response performance could be generalized to other non-western and nonprofit organizations because of the differences in the job nature and hence a study needs to be conducted to examine this.

Secondly, previous scholars (e.g. Beehr, 1976; Dailey, 1978; Dobbins & Zaccaro, 1986; Schriesheim, 1980) have revealed that cohesiveness has a moderating effect. However, these studies were mainly conducted at the individual level. In contrast, the present study investigated the moderating effect of cohesiveness at the group level. The Robbins's (1993) group behavior model proposes that the effects of team member resources and team structure would be moderated by the type of task. In the present study, because fire fighting team members have similar types of task during initial emergency response, the moderating influence of the type of task is therefore irrelevant to the present study. In its replacement, the present study examined the moderating effect of cohesiveness on the relationship between team structure variables and initial emergency response consistent with Bowers et al.'s (1996) argument that moderating variables at group level

studies derive from group influences or interaction such as cohesiveness. In addition, field theory (Lewin, 1958) postulates that team behavior is a complicated set of interactions and forces that affect team structure in the pursuit of achieving common goals. The results of the present study indicated that cohesiveness moderates the relationship between team structure variables and initial emergency response. When fire fighting team initial performance is primarily determined by high cohesive or low cohesive teams effect, team structure variables (age diversity and tenure diversity) have more effect on the initial response (Refer Table 6.19). The present findings suggest that cohesiveness enhancement could be strongly incorporated into theories of group dynamics. However, additional research is needed to examine the moderating role of cohesiveness, especially when examining team structure variables and its impact on team performance.

From a theoretical perspective, the findings of the present study validate the application of Robbins's (1993) group behavior model when applied to understanding performance over a short period of time. Previous studies have examined the effects of team member resources and team structure on performance among teams that are engaged in performance over a longer time (e.g. Leonard et al., 2004; Van Vianen & De Dreu, 2001). For example, Timmerman (2000), in a study among members of professional basketball teams found higher age diversity to be related to lower yearly winning percentage (i.e. number of wins divided by the total number of games played in a year). In contrast, some research settings performance is determined over a short period of time such as interview success. Although the current results with the application of Robbins's (1993) group behavior

model and the theoretical justification of field theory (Lewin, 1951) are promising when examining variances in performance over a short period of time, future research is required to further validate its application.

Finally, the current findings also offer contribution to the Robbins's (1993) group behavior model and field theory (Lewin, 1951). The physical ability variables especially weight and cardiovascular endurance were examined at individual levels (e.g. Buchner et al., 1996; P. O. Davis & Dotson, 1987; Samson et al., 2000; Troosters et al., 1999). For example, Williford et al. (1999), who studied fire fighters employed by the Montgomery Fire Department found that the higher body weight individuals had, the better they performed in simulated fire and rescue exercises. However, in the present study these variables were aggregated to represent team level variables. Although the present results using aggregated physical ability constructs have been found to be significantly predicting team performance. However, very few studies have used the aggregated physical ability construct at team level and more studies are required to further validate its importance in predicting job related team performance.

In summary, the results of the current investigation point to the importance of examining the role of team behavior in predicting initial emergency response performance. In addition, the study also has examined the moderating role of cohesiveness in understanding initial emergency response performance especially in the context that calls for extraordinary work performance.

7.4 LIMITATIONS

Whereas the present study provides some insight into the importance of team member resources and team structure in initial emergency response performance, several limitations of this research, both conceptual and methodological are notable. Firstly, this study examined initial emergency response from the team behavior perspective. However, team behavior plays a partial role in initial emergency response performance. Other factors such as emergency response system and resources may also contribute to or interfere with the initial emergency response performance (e.g. Alexander, 2003, 2005; Cameron, 1994; Kelly, 1995; Marchant, 2000; McEntire, 2002; Perry, 2003). The exclusion of these factors was a recognized limitation on the generalizability of the present results. However, as mentioned above the performance of the fire fighting team in seeking to achieve team goals depends on many factors such as emergency response personnel, emergency response system, and resources. Of importance amongst these is the "people" factor, that is the behavior of individual fire fighters and the contribution this makes to performance at group level (Senior, 1997). In the fire fighting context, they serve as the first line of defense providing high speed response (Flin & Slaven, 1996; Lewis & Payant, 2003; McGue & Barker, 1996) to minimize death, serious injuries, and property damage (Doyle, 1996; Kelly, 1995; Ramachandran, 1999; Tierney et al., 2001). Thus, examining the contributions of emergency response personnel towards initial emergency response performance is of equal importance.

Secondly, the initial emergency response measure was derived from the Occurrence Book that was kept at respective fire stations. The initial emergency response time is recorded by a duty officer, so the recording in the Occurrence Book was vulnerable to bias and errors in the process of recording and can be recognized as another limitation to the present study. As noted in Chapter 7, the study had to exclude 72 cases of initial emergency response time because it was suspected that the recording was not carried out properly as the record shows a consistent pattern of reporting of one or two minute initial response time for the period of five months. However, since the initial emergency response time was retrieved from a valid source i.e Occurrence Book, there is no reason to believe that the validity and the reliability of this source of information is suspect since the Occurrence Book is occasionally produced in courts when legal matters arise.

Finally, the present study only recorded the initial emergency response and not the overall time taken to respond to an emergency incident. The measure of initial emergency response time, which is not representative of the emergency response performance as a whole, was another limitation in the present investigation. However, understanding the importance of speed in the initial response is vital to the subsequent response activities and the fact that the first few seconds in an emergency is argued to be vital (Baldwin, 1994), studies of this sort are important to help understand the dynamics of initial emergency response performance. In addition, there are many factors namely traffic jams, distance to location, weather condition, unfamiliarity of the emergency location, type of fire, etc. that may influence the overall response performance of fire fighters. However, the present study

did not measure the overall emergency response time because it is difficult to control the factors mentioned above in the present study.

7.5 CONCLUSION

In Chapter 2, several gaps exist in the current emergency response literature concerning the relationship between team member resources, team structure, and initial emergency response performance. Previous studies on this area (Al-Ghamdi, 2002; Altintas & Bilir, 2001; Pillai & Williams, 2004) did not address the following issues in their research: (1) the use of group level analysis to examine the predictor of initial emergency response performance, (2) examination of the influence in an emergency context (except for the study by Pillai & Williams, (2004)), (3) the possible moderator on the relationship between team structure variables and initial emergency response performance (except for the study by Pillai & Williams, (2004)), (4) use of an objective performance measure in examining the initial emergency response performance in contrast to Pillai and Williams's (2004) subjective measure, and (5) weighting the initial emergency response time with distance traveled. The present study has contributed to the body of knowledge by examining the determinants of initial emergency response performance from the team perspective in the emergency response context, which included cohesiveness as a moderator and using a weighted objective performance measure. As such, the current attempt has managed to fill in gaps that exist in the emergency response literature.

In general, the present study has found that the initial emergency response performed by fire fighting teams employed by the Fire and Rescue Department of Malaysia (FRDM) is apparently better than that performed by other emergency responders in other countries that have been examined by previous studies (e.g. Al-Ghamdi, 2002; Altintas & Bilir, 2001). Secondly, the study found extroversion, cardiovascular endurance, age diversity, tenure diversity, and norms to be significantly related to initial emergency response performance. Finally, the present study found cohesiveness interacted with age diversity and tenure diversity in predicting initial emergency response performance.

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Appendix 1 – Daily Routine Task

JADUAL TUGAS HARIAN (JTH) SEMENANJUNG - 12 JAM

HARI / MASA	0800 0830	0830 1000	1000 1030	1030 1230	1230 1400	1400 1600	1600 1730	1730 1830	1830 2000	2000 2030	2030 2130	2130 0700	0700 0730	0730 0800
ISHIN SELASA	Perbarisan & Pemeriksaan Peralatan	Kawad Operasi	Bersedia di balai	Selenggara bangunan & lanskap	Bersedia di balai	Kelas Pengurusan	Bersedia di balai	Sukan	Bersedia di balai	Perbarisan & Pemeriksaan Peralatan	Kelas Teori Penyelamatan	Bersedia di balai	Jasmani	Kerja Pagi
SELASA RABU	Perbarisan & Pemeriksaan Peralatan	Kawad Operasi	Bersedia di balai	Kawad Operasi	Bersedia di balai	Kelas Akta 341	Bersedia di balai	Sukan	Bersedia di balai	Perbarisan & Pemeriksaan Peralatan	Kelas Teori Hazmat	Bersedia di balai	Jasmani	Kerja Pagi
RABU KHAMIS	Perbarisan & Pemeriksaan Peralatan	Pra Rancang Kebakaran / Kajian Kawasan	Pra Rancang Kebakaran / Kajian Kawasan	Pra Rancang Kebakaran / Kajian Kawasan	Bersedia di balai	Sedia Pra Rancang Kebakaran / Kajian Kawasan	Bersedia di balai	Sukan	Bersedia di balai	Perbarisan & Pemeriksaan Peralatan	Kelas Peralatan Kebombaan	Bersedia di balai	Jasmani	Kerja Pagi
KHAMIS JUMAAT	Perbarisan & Pemeriksaan Peralatan	Kawad Mahir	Bersedia di balai	Kawad Mahir	Bersedia di balai	Kelas Pencegah	Bersedia di balai	Sukan	Sembahyang Berjemaah & Tahlil	Perbarisan & Pemeriksaan Peralatan	Sembahyang Berjemaah & Tahlil	Bersedia di balai	Jasmani	Kerja Pagi
JUMAAT SABTU	Perbarisan & Pemeriksaan Peralatan	Kawad Kaki	Bersedia di balai	Selenggara bangunan & lanskap	Bersedia di balai	Kelas Kejuruteraan	Bersedia di balai	Sukan	Bersedia di balai	Perbarisan & Pemeriksaan Peralatan	Mesyuarat Pasukan	Bersedia di balai	Jasmani	Kerja Pagi
SABTU AHAD	Perbarisan & Pemeriksaan Peralatan	Selenggara Peralatan Kebombaan	Bersedia di balai / *Pemeriksaan Pili Bomba*	Selenggara Peralatan Kebombaan / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Sukan / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Perbarisan & Pemeriksaan Peralatan / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai	Jasmani	Kerja Pagi
AHAD ISNIN	Perbarisan & Pemeriksaan Peralatan	Uji Perjalanan Jentera Dan Pam	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Sukan / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Perbarisan & Pemeriksaan Peralatan / *Pemeriksaan Pili Bomba*	Bersedia di balai / *Pemeriksaan Pili Bomba*	Bersedia di balai	Jasmani	Kerja Pagi

JENIS KAWAD DAN KATEGORI

BIL	JENIS KAWAD	KATEGORI
1	Kawad Operasi	Kawad Hos / Kawad Suction dan Pam / Kawad Foam / Kawad Campuran / Kawad Stand Pipe/ Kawad Tangga
2	Kawad Mahir	Mengenal Peralatan Kebombaan / Tatacara Pemakaian BA / Ikatan Tali / Scuba / Hazmat / Peralatan Menyelamat
3	Kawad Kaki	Arahan dan Hukuman Kawad Kaki

Nota :

1 Balai-balai yang mempunyai perjawatan Unit Pili Bomba , penyelenggaran pili bomba perlu dilaksanakan mengikut jadual Penyelenggaraan Pili Bomba – Rujuk JBPM/PS/8

2 Balai-balai yang tiada perjawatan Unit Pili Bomba, Pemeriksaan Pili Bomba dilaksanakan berdasarkan jadual.

3 Jadual ini tertakluk kepada sebarang perubahan mengikut keadaan dan masa berdasarkan kelulusan Pegawai Penjaga Balai

C0000674 **Appendix 2 – Certification of the Weighing Scale**

METROLOGY CORPORATION MALAYSIA SDN. BHD.
499924-K

Tarikh Pemeriksaan: **6.3.2007**

Jenis Pemeriksaan: **Tahunan**

No. Sijil Penentuan: **016898/ MCM 667198**

(PENSWASTAAN PENENTUSAHAN ALAT TIMBANG DAN ALAT SUKAT)
LAPORAN PEMERIKSAAN ALAT TIMBANG DAN SUKAT DI BAWAH PERATURAN-PERATURAN TIMBANG DAN SUKAT, 1981

Perihal Pemunya:

Nama: **Chandra A/L Subramaniam**

Alamat: **Universiti Utara Malaysia,**

Poskod: **Sintok,Kedah**

Tel:

Rujukan: **MCM/KSP/LAPORAN/2007**

Tempat Pemeriksaan:
Kedai Timbang Dan Sukat Kulim
Taman Tunku Putra,Kulim,Kedah
Tel: **04-4950469** Fax:

Perihal Alat:

Pembuat: **Tanita (Jepun)**

Jenis Alat: **Alat Timbang Berat Badan**

No. Siri:

Had terima: **136 kg**

Senggatan: **50 g**

Nama Pembaik: **KTS Kulim,Kedah**
Tel: **04-4950469**

Rujukan Sijil SIRIM Bagi Standard Yang Digunakan: **NML/2468/M/06**

Had Selisih Dibenarkan: **50 g**

Ujian	Bacaan	Perbezaan +	Perbezaan −	Ujian	Bacaan	Perbezaan +	Perbezaan −
Sifar (0)	**0**	-	-				
25 kg	**25.00 kg**	-	-	Beban A E B Penjuru C D	-	-	-
50 kg	**50.00 kg**	-	-	Sudut 1/Penjuru A	**34.00 kg**	-	-
75 kg	**75.00 kg**	-	-	Sudut 2/Tengah	**34.00 kg**	-	-
100 kg	**100.00 kg**	-	-	Sudut 3/Penjuru B	**34.00 kg**	-	-
136 kg	**136.00 kg**	-	-	Sudut 4	-	-	-

Nota:

Pemeriksaan ini telah dijalankan mengikut peraturan dan kaedah-kaedah yang telah ditetapkan oleh Penyimpan Timbang dan Sukat dan dengan menggunakan Standard yang boleh dibandingkan dengan Standard Utama Malaysia.

Catatan: **Laporan sah sehingga 5.3.2008**

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Tandatangan:
Nama dan Jawatan Inspektor Penentusahan

METROLOGY CORPORATION MALAYSIA SDN. BHD. SUNGAI PETANI (499924-K)

RM 24.00

Appendix 3 – Team Member Questionnaire

UNIVERSITI UTARA MALAYSIA

Dear Firefighter

I realize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10-15 minutes of your time, is vital to the success of this study.

I am a graduate student of Universiti Utara Malaysia and conducting a survey regarding Fire and Rescue Department Malaysia (FRDM) emergency response team, to fulfill the PhD requirement of the university. The objective of this study is to help me understand the relationship between team member resources, team structure, and team performance.

Please be rest assured that all your responses will be kept strictly confidential and I will keep your identity anonymous. All the data will be aggregated and will be strictly used for academic purposes only.

I look forward to working with you. Thank you in advance for your cooperation.

If you are interested in this study please contact me through email at chandra@uum.edu.my or call me at 04-9283821 or write to me at Faculty of Human and Social Development, Universiti Utara Malaysia, 06010 Sintok, Kedah.

Sincerely

Chandrakantan Subramaniam
PhD Candidate

SECTION A: DEMOGRAPHIC INFORMATION

Please fill in the blank and tick (✓) the appropriate boxes that corresponds to your answer to each of the question below.

1. Your marital status

☐ Single
☐ Married
☐ Divorced/Widowed

2. Your educational level

☐ Primary Education
☐ LCE/SRP/PMR
☐ MCE/SPM/SPMV
☐ HSC/STPM

Others (Please specify):

_____

3. Your race

☐ Malay
☐ Chinese
☐ Indian

Others (Please specify):

_____

4. Your age (Please specify):

_____

years

5. How long have you been working with Fire and Rescue Department Malaysia? _____ years.

6. How long have you been working with the present team at the current fire station? _____ years.

7. What is your designation in the team?

☐ Ketua Ahli Bomba (please proceed to Section B)
☐ Ahli Bomba Kanan (please answer Question 8)
☐ Ahli Bomba (please answer Question 8)

8. How long have you been working with the present Ketua Ahli Bomba? _____ years.

SECTION B: PERSONALITY

Following are statements pertaining to team member personality. Considering only yourself, please indicate the extent to which the following statements are true of yourself. Please circle the appropriate response based on the scale which 1= Strongly Disagree to 4= Strongly Agree that best describes your response. Please keep your response general to yourself as a whole and please answer all questions objectively and as honest as possible.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I am always prepared for anything.	1	2	3	4
2. I always pay attention to details.	1	2	3	4
3. I always make a mess of things.	1	2	3	4
4. I always get chores done right away.	1	2	3	4
5. I always like order.	1	2	3	4
6. I always feel concern for others.	1	2	3	4
7. I am always interested in others.	1	2	3	4
8. I rarely insult people.	1	2	3	4
9. I always sympathize with others' feelings.	1	2	3	4
10. I am always interested in other people's problem.	1	2	3	4
11. I always take time out for others.	1	2	3	4
12. I worry about things.	1	2	3	4
13. I get upset easily.	1	2	3	4
14. I change my mood a lot.	1	2	3	4
15. I have frequent mood swings.	1	2	3	4
16. I get irritated easily.	1	2	3	4
17. I often feel blue.	1	2	3	4
18. I feel comfortable around people.	1	2	3	4
19. I am always the first to start a conversation.	1	2	3	4
20. I talk to a lot of different people at functions.	1	2	3	4
21. I don't talk a lot.	1	2	3	4
22. I always stay in the background.	1	2	3	4
23. I have little to say.	1	2	3	4

SECTION C: LEADERSHIP

Following are statements pertaining to the way your team leader behaves. Considering only your team leader, please indicate the extent to which the following statements are true of your team leader. Please circle the appropriate response based on the scale which 1= Strongly Disagree to 4= Strongly Agree that best describes your response. Please keep your response general to your team leader as a whole and please answer all questions objectively and as honest as possible.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. My Ketua Ahli Bomba helps people to make working on their tasks more pleasant.	1	2	3	4
2. My Ketua Ahli Bomba looks out for the personal welfare of group members.	1	2	3	4
3. My Ketua Ahli Bomba does little things to make things pleasant.	1	2	3	4
4. My Ketua Ahli Bomba treats all group members as equals.	1	2	3	4
5. My Ketua Ahli Bomba explains the way tasks should be carried out.	1	2	3	4
6. My Ketua Ahli Bomba decides what and how things shall be done.	1	2	3	4
7. My Ketua Ahli Bomba maintains definite standards of performance.	1	2	3	4
8. My Ketua Ahli Bomba schedules the work to be done.	1	2	3	4

SECTION D: ROLES

Following are statements pertaining to your role as firefighters. Considering only yourself, please indicate the extent to which the following statements are true of yourself. Please circle the appropriate response based on the scale which 1= Strongly Disagree to 4= Strongly Agree that best describes your response. Please keep your response general to yourself as a whole and please answer all questions objectively and as honest as possible.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I always think of my job as a firefighter and rescuer.	1	2	3	4
2. I would feel a loss if I were forced to give up being a firefighter and rescuer.	1	2	3	4
3. I really have clear feelings about responding to emergency.	1	2	3	4
4. For me, being a firefighter means more than just firefighting and rescuing for a living.	1	2	3	4
5. Firefighting and rescuing is an important part of who I am.	1	2	3	4
6. I rarely think of my job as a firefighter and rescuer.	1	2	3	4

SECTION E: NORMS

Following are statements pertaining to the cooperative norms in your team. Considering only your team, please indicate the extent to which the following statements are true of your team. Please circle the appropriate response based on the scale which 1= Strongly Disagree to 4= Strongly Agree that best describes your response. Please keep your response general to your team as a whole and please answer all questions objectively and as honest as possible.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. It is important for us to maintain harmony within our team.	1	2	3	4
2. There is little collaboration among our team members.	1	2	3	4
3. There is a high level of cooperation between our team members.	1	2	3	4
4. My team members are willing to sacrifice their self interest for the benefit of our team.	1	2	3	4
5. There is a very high level of sharing between our team members.	1	2	3	4

SECTION F: COHESIVENESS

Following are statements pertaining to the cohesiveness in your team. Considering only yourself, please indicate the extent to which the following statements are true of yourself. Please circle the appropriate response based on the scale which 1= Strongly Disagree to 4= Strongly Agree that best describes your response. Please keep your response general to yourself as a whole and please answer all questions objectively and as honest as possible.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. If given a chance, I would choose to leave my team and join another.	1	2	3	4
2. The members of my team get along very well together.	1	2	3	4
3. The members of my team will readily defend each other from criticism by outsiders.	1	2	3	4
4. I feel that I am really a part of my team.	1	2	3	4
5. I look forward to being with the members of my team each day.	1	2	3	4
6. I find that I generally do not get along with the other members of my team.	1	2	3	4
7. I enjoy belonging to this team because I am friends to all my team members.	1	2	3	4
8. The team which I belong to is a close one.	1	2	3	4
9. The team was composed of people who fit together.	1	2	3	4
10. I want to remain a member of my team.	1	2	3	4
11. There is a feeling of unity and cohesion in my team.	1	2	3	4

SECTION G: PHYSICAL FITNESS

1. Weight: _____ kg

2. Height: _____ meters

3. Cardiovascular Endurance: _____ meters

Appendix 4 – Dependent Variable's Customized Form

UNIVERSITI UTARA MALAYSIA

Dear Firefighter

I realize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10-15 minutes of your time, is vital to the success of this study.

I am a graduate student of Universiti Utara Malaysia and conducting a survey regarding Fire and Rescue Department Malaysia (FRDM) emergency response team, to fulfill the PhD requirement of the university. The objective of this study is to help me understand the relationship between team member resources, team structure, and team performance.

Please be rest assured that all your responses will be kept strictly confidential and I will keep your identity anonymous. All the data will be aggregated and will be strictly used for academic purposes only.

I look forward to working with you. Thank you in advance for your cooperation.

If you are interested in this study please contact me through email at chandra@uum.edu.my or call me at 04-9283821 or write to me at Faculty of Human and Social Development, Universiti Utara Malaysia, 06010 Sintok, Kedah.

Sincerely

Chandrakantan Subramaniam
PhD Candidate

Station:

Team:

No	Date	Time Receive Call	Time Leaving the Station	Response Time	Gempar	Notes
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						

Appendix 5 – Written Permission to Conduct the Study

IBU PEJABAT,
JABATAN BOMBA DAN PENYELAMAT,
MALAYSIA,
Headquarters,
Fire and Rescue Department, Malaysia,
Lebuh Wawasan, Presint 7,
62250 PutraJaya.

Telefon: : 603-88880036
Ketua Pengarah : 603-88880021
Facsimile : 603-88880023
Homepage : *www.bomba.gov.my*
E-mail : *pro@bomba.gov.my*

'Q' 'PROFESIONALISME TERAS KECEMERLANGAN'

Ruj Tuan:

Ruj.Kami: JPBM:LAT/002/4/1/1/9 (45)
(Our Ref:)

Tarikh: 1 hb Jun, 2006

Timbalan Dekan ,
Akademik dan Pembangunan Pelajar,
Fakulti Pembangunan Sosial dan Manusia,
Universiti Utara Malaysia,
06010 Sintok
KEDAH.
(u.p: En. Chandrakantan Subramaniam)

Tuan,

KEBENARAN BAGI MENJALANKAN PENYELIDIKAN DI JABATAN BOMBA DAN PENYELAMAT MALAYSIA.

Merujuk perbincangan diantara tuan dengan En. Zainal bin Madasin bertarikh 31hb Mei 2006 mengenai perkara diatas adalah berkaitan.

2. Sukacita dimaklumkan bahawa, Jabatan Bomba Dan Penyelamat Malaysia tiada halangan atas permohonan tuan untuk membuat penyelidikan bagi tujuan pembelajaran. Sehubungan itu , seperti yang telah dipersetujui sebelum penyelidikan dijalankan tuan adalah dikehendaki hadir untuk berjumpa dengan En. Zainal bin Madasin di Bahagian Latihan dan Perancangan Tenaga Manusia bagi perbincangan lanjut tentang jadual dan perkara-perkara berbangkit.

3. Kerjasama tuan dalam perkara ini amatlah dihargai.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(KHIRUDIN BIN DRAHMAN)
Penolong Ketua Pengarah,
Bahagian Latihan dan Perancangan Tenaga Manusia,
b.p: Ketua Pengarah,
Jabatan Bomba dan Penyelamat,
Malaysia.

s.k.
i. YAS Ketua Pengarah
ii) YAS Timbalan Ketua Pengarah (Pengurusan)

IBU PEJABAT,
JABATAN BOMBA DAN PENYELAMAT,
MALAYSIA,
LEBUH WAWASAN, PRECINT 7
62250 PUTRAJAYA.

Telefon : 603-88880036
Faks : 603-88880025
Laman Web : *www.bomba.gov.my*
E-mail : *kupa@bomba.gov.my*

'Q' **'PROFESIONALISME TERAS KECEMERLANGAN'**

Ruj. Tuan :

Ruj. Kami: JBPM:PAW/013/16 Jld.26

Tarikh :
19 JUN 2007

Encik Chandrakantan Subramaniam
Pelajar Doktor Falsafah
Fakulti Pembangunan Sosial dan Manusia
Universiti Utara Malaysia
06010 Sintok Kedah.

Tuan,

MAKLUMBALAS PENYELIDIKAN DI JABATAN BOMBA DAN PENYELAMAT MALAYSIA

Saya dengan hormatnya merujuk kepada surat tuan bertarikh 3 Mei 2007 adalah berkaitan.

2. Jabatan ini tiada halangan untuk tuan menjalankan penyelidikan di Jabatan Bomba dan Penyelamat Malaysia bagi Pengajian Doktor Falsafah berdasarkan kepada proposal penyelidikan tuan.

3. Satu salinan kertas penyelidikan tuan hendaklah dikemukakan ke Jabatan ini untuk rujukan.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DATO' WAN MOHD NOR BIN HJ. IBRAHIM)
Timbalan Ketua Pengarah (P)
Jabatan Bomba Dan Penyelamat,
Malaysia.

s.k PKP Bahagian Lat & PTM – Disertakan salinan proposal penyelidikan Encik Chandrakantan Subramaniam.

Azma/stCHANDRA

JABATAN BOMBA DAN PENYELAMAT
NEGERI SELANGOR DARUL EHSAN,
No. 3, Persiaran Tebar Layar,
Bukit Jelutong, Seksyen U8,
40150 SHAH ALAM,
SELANGOR DARUL EHSAN

Telefon :03 - 7846 4444
Fax :03 - 7846 9892
Web Site :http://www.bomba.gov.my

"Q" **"PROFESIONALISME TERAS KECEMERLANGAN"**

Ruj. Tuan :
(Your Ref)
Ruj. Kami : JBPM :SL/PAW/013/20/2/10/2 ( )
(Our Ref)
Tarikh : 21 Jun 2007
(Date)

Universiti Utara Malaysia
Fakulti Pembangunan Sosial dan Manusia
06010 Sintok
Kedah Darul Aman
(u.p : Chandrakantan Subramaniam)

Tuan,

KEBENARAN BAGI MENJALANKAN PENYELIDIKAN DI JABATAN BOMBA DAN PENYELAMAT, MALAYSIA, NEGERI SELANGOR

Saya dengan hormatnya merujuk perkara di atas.

2. Sukacita dimaklumkan bahawa Jabatan ini tiada halangan untuk pihak tuan menjalankan penyelidikan di Jabatan Bomba dan Penyelamat, Malaysia, Negeri Selangor bagi tujuan pembelajaran pada tarikh, masa dan tempat seperti dilampiran A.

3. Kerjasama pihak tuan berhubung perkara ini amatlah dihargai dan didahului dengan ucapan terima kasih.

Sekian.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(HAJI AMER BIN HAJI YUSOF)
Pengarah
Jabatan Bomba dan Penyelamat, Malaysia
Negeri Selangor Darul Ehsan.

MS ISO 9001 : 2000
MAMPU
No. Pendaftaran : P.A 0063

s.k i. Semua Pegawai Penjaga Balai Bomba dan Penyelamat, Negeri Selangor

JABATAN BOMBA DAN PENYELAMAT MALAYSIA
NEGERI MELAKA,
JALAN TUN HAMZAH,
BUKIT KATIL,
75450 MELAKA

Tel. : *06-2513100*
Pengarah : *06-2513113*
No. Fax : *06-2311023*
E-mail : *bommka@po.jaring.my*

Q *'PROFESIONALISME TERAS KECEMERLANGAN'*

Rujukan Kami : JBPM:MK/006/7/1 ( )
Tarikh : 27 Mac 2007

Encik Chandrakantan Subramaniam
Pelajar Doktor Falsafah
Fakulti Pembangunan Sosial dan Manusia
Universiti Utara Malaysia
06010 Sintok Kedah

Tuan

KEBENARAN BAGI MENJALANKAN PENYELIDIKAN DI JABATAN BOMBA DAN PENYELAMAT MALAYSIA NEGERI MELAKA

Saya dengan hormatnya merujuk kepada surat tuan bertarikh 12 Mac 2007 mengenai perkara di atas.

2. Sukacita dimaklumkan bahawa JBPM Negeri Melaka tiada halangan di atas permohonan tuan untuk menjalankan penyelidikan di Jabatan ini bagi tujuan akademik.

3. Sehubungan dengan itu, tuan boleh menghubungi Penolong Pengarah Bahagian Latihan Negeri Melaka sebelum penyelidikan dijalankan.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah

(ABD. RAZAK BIN MUDA)
Timbalan Pengarah
bp Pengarah
Jabatan Bomba dan Penyelamat
Negeri Melaka

s:k : YAS Ketua Pengarah.

KA/rmi...

جباتن بومبا دان ڤيلامة مليسيا
JABATAN BOMBA DAN PENYELAMAT MALAYSIA
IBU PEJABAT
JABATAN BOMBA DAN PENYELAMAT NEGERI TERENGGANU
JALAN KEMAJUAN, BUKIT KECIL,
20648 KUALA TERENGGANU, TERENGGANU DARUL IMAN.

Tel. : 09-622 4444, 623 4444
624 3103, 624 3104
Fax. : 09-622 9009
E-Mail : Bomtrg@tm.net.my

'Q' PROFESIONALISME
TERAS KECEMERLANGAN

Ruj.Kami : JBPM:TR/LAT/004/5/3(5)
Tarikh : 08 April 2007

Visit Malaysia 2007
Celebrating 50 Years of Nationhood

~SENARAI EDARAN~

Tuan,

KEBENARAN BAGI MENJALANKAN PENYELIDIKAN DI JABATAN BOMBA DAN PENYENYELAMAT NEGERI TERENGGANU

Saya dengan segala hormatnya merujuk perkara diatas.

2. Adalah dimaklumkan En Chandrakantan a/l Subramaniam (No.Matrik:90712) merupakan seorang pelajar pengajian Doktor Falsafah di Universiti Utara Malaysia (UUM). Beliau akan menjalankan penyelidikan berkenaan ciri-ciri pasukan mempengaruhi keberkesanaan pasukan melaksanaan tugas dan tanggunjawab memberikan respons dalam kes-kes dan situasi kecemasan.

3. Sehubungan dengan itu, mohon dari semua YS Pegawai Penjaga, Balai Bomba Dan Penyelamat, Negeri Terengganu untuk memberi kerjasama kepada beliau sepanjang penyelidikan dijalankan.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(MADZLAN BIN HASHIM)
Timbalan Pengarah,
Jabatan bomba Dan Penyelamat,
Negeri Terengganu.

JABATAN BOMBA DAN PENYELAMAT,
WILAYAH PERSEKUTUAN, KUALA LUMPUR
Headquarters,
Fire and Rescue Department, W.Persekutuan, K. Lumpur.
Jalan Maharajalela
50648 KUALA LUMPUR

Telefon: : 603-21484444
Facsimile : 603-21451625
E-mail: jpb1@po.jaring.my

"Q" *"PROFESIONALISME TERAS KECEMERLANGAN "*

Ruj. Tuan:
(Your Ref:)

Ruj. Kami: JBPM: WP/OPS/013/16/2/
(Our Ref:)

Tarikh: 23 Julai 2007.

En. Chandrakantan Subramaniam
Pelajar Doktor Falsafah,
Fakulti Pembangunan Sosial dan Manusia,
Universiti Utara Malaysia
06010 Sintok, Kedah

Tuan,

MAKLUMAN PERJALANAN PENYELIDIKAN TENTATIF DI JABATAN BOMBA DAN PENYELAMAT WILAYAH PERSEKUTUAN KUALA LUMPUR

Saya dengan segala hormatnya merujuk kepada surat tuan bertarikh 14 Jun 2007 mengenai perkara di atas.

2. Sehubungan dengan itu, jabatan kami tiada apa-apa halangan ke atas penyelidikan yang dilakukan oleh pihak tuan terhadap pegawai-pegawai di balai-balai bomba di Wilayah Persekutuan Kuala Lumpur seperti di jadual yang dilampirkan..

3. Sayugia diingatkan bahawa hasil daripada kajian berkenaan tidak dibenarkan untuk tujuan disebar kepada orang awam kecuali telah mendapat kelulusan daripada YAS Ketua Pengarah, Jabatan Bomba dan Penyelamat Malaysia dan satu salinan kajian berkenaan hendaklah diserahkan kepada jabatan kami sebagai rujukan

3. Segala kerjasama dan perhatian daripada pihak tuan saya dahului dengan ribuan terima kasih.

Sekian.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(MOHAMMAD HAMDAN B. WAHID)
Pengarah,
Jabatan Bomba dan Penyelamat,
Wilayah Persekutuan Kuala Lumpur.

IBU PEJABAT,
JABATAN BOMBA DAN PENYELAMAT,
NEGERI PULAU PINANG,
JALAN PERUSAHAAN,
13600 PERAI,
SEBERANG PERAI

Telefon : 04-3970760
04-3970761
04-3905924
04-3905759
Pengarah : 04-3981544
No. Fax : 04-3982544
Homepage : www.bombapp.gov.my
E-mail : operasi_pp@yahoo.com

'Q' **PROFESIONALISME**
TERAS KECEMERLANGAN

Ruj. Tuan :

Ruj. Kami : JBPM:PP/013/11/7/Jld.4(89)

Tarikh : 19 Jun 2007

Chandrakantan Subramaniam
Pelajar Doktor Falsafah,
Fakulti Pembangunan Sosial Dan Manusia,
Universiti Utara Malaysia,
06010 Sintok Kedah,

Tuan,

MAKLUMAN PERJALANAN PENYELIDIKAN TENTATIF DI JABATAN BOMBA DAN PENYELAMAT NEGERI PULAU PINANG

Dengan segala hormatnya merujuk perkara diatas.

2. Sukacita dimaklumkan bahawa Jabatan tiada halangan untuk membenarkan tuan menjalankan penyelidikan tentatif di Jabatan Bomba Dan Penyelamat Negeri Pulau Pinang seperti jadual yang di terima sekiranya tuan mengemukakan surat kebenaran bil. JBPM: PAW/013/16 dari YAS Dato' Ketua Pengarah. Sayugia diingatkan agar tuan tidak menyentuh perkara-perkara berkaitan dasar-dasar kerajaan semasa penyelidikan dibuat. Sila hubungi Pegawai Perhubungan Awam Negeri Encik Rosdi bin Ismail melalui talian 013-4820193 atau 04-3929847 untuk sebarang pertanyaan.

Sekian,terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DATO' RUSMANI BIN MUHAMAD)
Pengarah,
Jabatan Bomba Dan Penyelamat, Malaysia,
Negeri Pulau Pinang.

JABATAN BOMBA DAN PENYELAMAT
NEGERI SELANGOR DARUL EHSAN, No. 3,
Persiaran Tebar Layar,
Bukit Jelutong, Seksyen U8,
40150 Shah Alam,
SELANGOR DARUL EHSAN.

Telefon : *03-78464444*
Fax : *03-78471876*
Web : *www.bombasel.gov.my*

'Q' "PROFESIONALISME
TERAS KECEMERLANGAN"

Ruj. Tuan :
(YourRref.)
Ruj. Kami : JBPM:SL/PAW/013/20/2/10/2( )
(Our Ref)
Tarikh : 10 September 2007
(Date)

Fakulti Pembangunan Sosial dan Manusia,
Universiti Utara Malaysia,
06010 Sintok Kedah.
(u.p En. Chandrakantan Subramaniam)

Tuan,

PENYELIDIKAN SUSULAN DI JABATAN BOMBA DAN PENYELAMAT NEGERI SELANGOR

Saya dengan hormatnya diarah merujuk kepada perkara di atas dan surat tuan bertarikh 05 Ogos 2007 adalah berkaitan.

2. Sukacita dimaklumkan, bahawa Jabatan ini tiada halangan untuk tuan menjalankan penyelidikan susulan di Jabatan Bomba dan Penyelamat Malaysia, Negeri Selangor bagi tujuan penyelidikan.

3. Adalah diingatkan bahawa, segala maklumat yang diperolehi dari Jabatan adalah hanya untuk tujuan pembelajaran sahaja, pihak tuan juga tidak dibenarkan menerbit artikel berkaitan maklumat yang diperolehi di mana-mana penerbitan tanpa mendapat kebenaran terlebih dahulu dari Jabatan ini.

4. Kerjasama pihak tuan berhubung perkara ini amatlah dihargai dan didahului dengan ucapan terima kasih.

Sekian.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(NORIZAN BIN SAAD)
Pegawai Perhubungan Awam,
b.p Pengarah,
Jabatan Bomba dan Penyelamat, Malaysia,
Negeri Selangor Darul Ehsan.

s.k - YS Pengarah JBPM, Negeri Selangor.
- YS Penolong Pengarah Bahagian Latihan & PTM
- Fail

MS ISO 9001 : 2000
MAMPU
No. Pendaftaran : P.A 0063

(67)

"Q" PROFESIONALISME
TERAS KECEMERLANGAN

MEMO

Daripada	:	YS Penolong Pengarah Operasi, Jabatan Bomba Dan Penyelamat, Negeri Melaka.
Kepada	:	Senarai Edaran
Salinan Kepada	:	YS.Pengarah Ys Timbalan Pengarah
Bilangan Fail	:	JBPM: MK/OPS/013/16/6 Jld.4 (68) Tarikh : 19.09.2007

MAKLUMAN PENJALANAN PENYELIDIKAN SUSULAN DI JABATAN BOMBA DAN PENYELAMAT NEGERI MELAKA

Tuan , ,

Adalah saya dengan hormatnya merujuk perkara di atas adalah berkaitan.

2. Sukacita dimaklumkan bahawa satu menyelidikan di JBPM Negeri Melaka akan dijalan dari Pelajar UUM pada tarikh yang telah ditetapkan. Sehubungan dengan itu, tuan dikehendaki memastikan Bilik Kawalan dan Awasan berada dalam keadaan kemas dan bersih serta anggota yang bertugas pada hari tersebut perlu memberi kerjasama semasa penyelidikan dijalankan.

3. Bersama-sama ini, sesalinan surat dari pelajar tersebut. Sekian untuk makluman dan tindakan pihak tuan

Terima kasih.

" BERKHIDMAT UNTUK NEGARA "

Saya yang menurut perintah,

(EZHUMALAI A/L RATANAM)
Penolong Pengarah Operasi,
bp Pengarah
Jabatan Bomba Dan Penyelamat,
Negeri Melaka.

REM.....nma

جباتن بومبا دان ڤيلامة مليسيا
JABATAN BOMBA DAN PENYELAMAT MALAYSIA
IBU PEJABAT
JABATAN BOMBA DAN PENYELAMAT NEGERI TERENGGANU
JALAN KEMAJUAN, BUKIT KECIL,
20648 KUALA TERENGGANU, TERENGGANU DARUL IMAN.

Tel. : 09-622 4444, 623 4444
634 3103, 624 3104
Fax. : 09-622 9009
Laman web : bombatrg. gov.my

'Q' PROFESIONALISME
TERAS KECEMERLANGAN

Ruj.Kami :JBPM:TR/LAT/004/2/6 Jld.IV ( )
Tarikh : 17 Sept 2007

~ Senarai Edaran ~

Visit Malaysia 2007

Tuan,

MAKLUMAN LAWATAN PELAJAR PRAKTIKAL KEBALAI BALAI BOMBA DAN PENYELAMAT MALAYSIA NEGERI TERENGGANU

Saya dengan segala hormatnya merujuk kepada perkara di atas dan surat dari Universiti Utara Malaysia bertarikh 17 Sept 2007 adalah berkaitan.

2 Sukacita dimaklumkan bahawa pelajar dari UUM akan membuat penyelidikan di balai balai seluruh negeri Terengganu .

3 Sehubungan dengan itu, bersama dengan ini disertakan brosur berkenaan untuk maklúman dan tindakan pihak tuan selanjutnya.

Sekian, terima kasih,

" BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(MD ALI BIN JUSOH)
Penolong Pengarah,
Bahagian Latihan & PTM,
Jabatan Bomba Dan Penyelamat,
Negeri Terengganu.

s.k: Fail Timbul

MS ISO 9001 : 2000
SIRIM
No. Pendaftaran : JA 0043

IBU PEJABAT,
JABATAN BOMBA DAN PENYELAMAT,
WILAYAH PERSEKUTUAN, KUALA LUMPUR
Headquarters,
Fire and Rescue Department, W.Persekutuan, K. Lumpur.
Jalan Maharajalela
50648 KUALA LUMPUR

Telefon: : 603-21484444
Facsimile : 603-21451625
E-mail: *jpbl@po.jaring.my*

'Q' ' ***'PROFESIONALISME TERAS KECEMERLANGAN'***

Ruj. Tuan:
(Your Ref:)

Ruj. Kami:
(Our Ref:) JBPM: WP/OPS/013//16/2/Jld.14(42)
Tarikh: 18hb. September 2007

En. Chandrakatan Subramaniam
Pelajar Doktof Falsafah,
Fakulti Pembangunan Sosial dan Manusia,
Universiti Utara Malaysia,
06010 Sintok

Tuan,

PENYELIDIKAN SUSULAN DI JABATAN BOMBA & PENYELAMAT - WILAYAH PERSEKUTUAN KUALA LUMPUR .

Dengan hormatnya merujuk perkara di atas dan surat tuan bertarikh 5 Ogos 2007 adalah berkaitan.

2. Jabatan Bomba dan Penyelamat Wilayah Persekutuan Kuala Lumpur **tiada halangan** bagi pihak tuan untuk menjalankan penyelidikan susulan di Jabatan ini pada **12 November hingga 20 November 2007.**

3. Kebenaran ini tertaklut kepada sayarat-syarat terdalulu yang dikeluarkan oleh jabatan ini.

Sekian terima kasih.

" BERKHIDMAT UNTUK NEGARA "

Saya yang menurut perintah,

(PKgB MD ALI BIN ISMAIL)
Pen. Pengarah Operasi
Jabatan Bomba Dan Penyelamat,
Wilayah Persekutuan Kuala Lumpur

s.k, - YS. Pengarah
- Semua Pegawai Penjaga JBPMWPKL
- Fail

MAI/etc

Appendix 6 – Explore Study Variables Testing the Assumptions of Linearity and Normality

Explore-Study Variables

Descriptives

			Statistic	Std. Error
WEIGHTAVE	Mean		75.3016	.44107
	95% Confidence Interval for Mean	Lower Bound	74.4287	
		Upper Bound	76.1745	
	5% Trimmed Mean		75.2116	
	Median		74.9238	
	Variance		24.512	
	Std. Deviation		4.95100	
	Minimum		63.67	
	Maximum		88.93	
	Range		25.26	
	Interquartile Range		7.09	
	Skewness		.237	.216
	Kurtosis		-.161	.428
HEIGHTAVE	Mean		168.4001	.20059
	95% Confidence Interval for Mean	Lower Bound	168.0031	
		Upper Bound	168.7971	
	5% Trimmed Mean		168.4561	
	Median		168.6750	
	Variance		5.070	
	Std. Deviation		2.25166	
	Minimum		162.13	
	Maximum		173.32	
	Range		11.19	
	Interquartile Range		3.52	
	Skewness		-.370	.216
	Kurtosis		-.208	.428
CARDIO_1 SMEAN(CARDIOAVE)	Mean		142.4977	.98157
	95% Confidence Interval for Mean	Lower Bound	140.5551	
		Upper Bound	144.4404	
	5% Trimmed Mean		142.5089	
	Median		142.0635	
	Variance		121.399	
	Std. Deviation		11.01812	
	Minimum		109.60	
	Maximum		176.79	
	Range		67.19	
	Interquartile Range		15.11	
	Skewness		-.015	.216
	Kurtosis		.696	.428

Descriptives

			Statistic	Std. Error
EmotionalStability	Mean		2.8928	.01614
	95% Confidence Interval for Mean	Lower Bound	2.8609	
		Upper Bound	2.9247	
	5% Trimmed Mean		2.8928	
	Median		2.8938	
	Variance		.033	
	Std. Deviation		.18113	
	Minimum		2.36	
	Maximum		3.44	
	Range		1.08	
	Interquartile Range		.21	
	Skewness		.032	.216
	Kurtosis		.548	.428
Extraversion	Mean		2.5585	.01891
	95% Confidence Interval for Mean	Lower Bound	2.5210	
		Upper Bound	2.5959	
	5% Trimmed Mean		2.5600	
	Median		2.5600	
	Variance		.045	
	Std. Deviation		.21226	
	Minimum		2.00	
	Maximum		3.08	
	Range		1.08	
	Interquartile Range		.30	
	Skewness		-.093	.216
	Kurtosis		-.216	.428
AGEDIV	Mean		.2567	.00553
	95% Confidence Interval for Mean	Lower Bound	.2457	
		Upper Bound	.2676	
	5% Trimmed Mean		.2581	
	Median		.2600	
	Variance		.004	
	Std. Deviation		.06211	
	Minimum		.08	
	Maximum		.40	
	Range		.32	
	Interquartile Range		.08	
	Skewness		-.314	.216
	Kurtosis		.360	.428

Descriptives

			Statistic	Std. Error
ORGTENDIV	Mean		.7341	.01877
	95% Confidence Interval for Mean	Lower Bound	.6970	
		Upper Bound	.7713	
	5% Trimmed Mean		.7335	
	Median		.7450	
	Variance		.044	
	Std. Deviation		.21068	
	Minimum		.17	
	Maximum		1.24	
	Range		1.07	
	Interquartile Range		.27	
	Skewness		.066	.216
	Kurtosis		-.051	.428
Leadership	Mean		3.1682	.02046
	95% Confidence Interval for Mean	Lower Bound	3.1277	
		Upper Bound	3.2087	
	5% Trimmed Mean		3.1739	
	Median		3.1613	
	Variance		.053	
	Std. Deviation		.22966	
	Minimum		2.38	
	Maximum		3.70	
	Range		1.32	
	Interquartile Range		.30	
	Skewness		-.372	.216
	Kurtosis		.489	.428
Roles	Mean		3.6511	.01418
	95% Confidence Interval for Mean	Lower Bound	3.6231	
		Upper Bound	3.6792	
	5% Trimmed Mean		3.6533	
	Median		3.6575	
	Variance		.025	
	Std. Deviation		.15920	
	Minimum		3.22	
	Maximum		3.97	
	Range		.75	
	Interquartile Range		.19	
	Skewness		-.280	.216
	Kurtosis		-.248	.428

Descriptives

			Statistic	Std. Error
Norms	Mean		3.2512	.01757
	95% Confidence Interval for Mean	Lower Bound	3.2164	
		Upper Bound	3.2860	
	5% Trimmed Mean		3.2482	
	Median		3.2280	
	Variance		.039	
	Std. Deviation		.19721	
	Minimum		2.74	
	Maximum		3.71	
	Range		.97	
	Interquartile Range		.29	
	Skewness		.270	.216
	Kurtosis		-.354	.428
Cohesiveness	Mean		3.2094	.01676
	95% Confidence Interval for Mean	Lower Bound	3.1762	
		Upper Bound	3.2426	
	5% Trimmed Mean		3.2118	
	Median		3.2016	
	Variance		.035	
	Std. Deviation		.18812	
	Minimum		2.73	
	Maximum		3.59	
	Range		.86	
	Interquartile Range		.26	
	Skewness		-.099	.216
	Kurtosis		-.440	.428

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
WEIGHTAVE	.041	126	.200*
HEIGHTAVE	.070	126	.200*
CARDIO_1 SMEAN(CARDIOAVE)	.080	126	.046
EmotionalStability	.059	126	.200*
Extraversion	.054	126	.200*
AGEDIV	.068	126	.200*
ORGTENDIV	.054	126	.200*
Leadership	.051	126	.200*
Roles	.071	126	.191
Norms	.071	126	.200*
Cohesiveness	.041	126	.200*

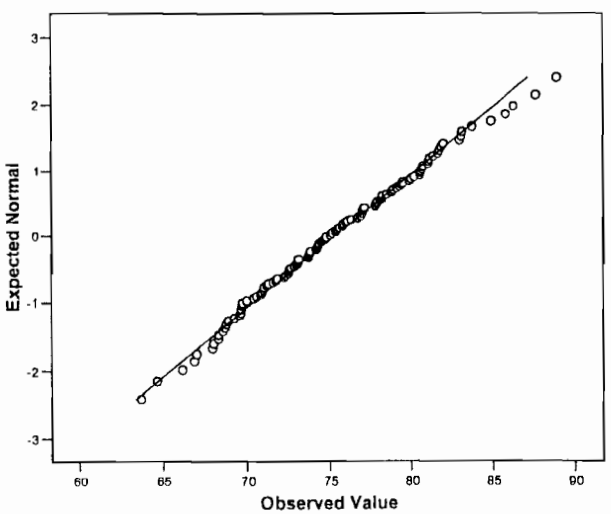
Tests of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
WEIGHTAVE	.993	126	.807
HEIGHTAVE	.985	126	.167
CARDIO_1 SMEAN(CARDIOAVE)	.986	126	.201
EmotionalStability	.994	126	.844
Extraversion	.996	126	.967
AGEDIV	.986	126	.217
ORGTENDIV	.994	126	.874
Leadership	.988	126	.363
Roles	.984	126	.134
Norms	.985	126	.185
Cohesiveness	.989	126	.383

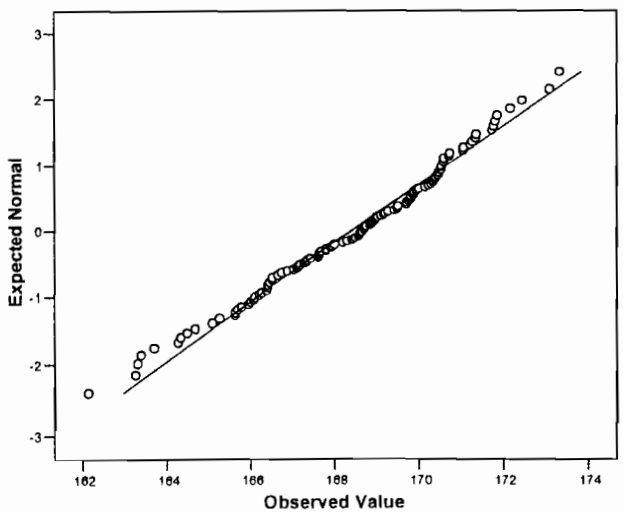
*. This is a lower bound of the true significance.

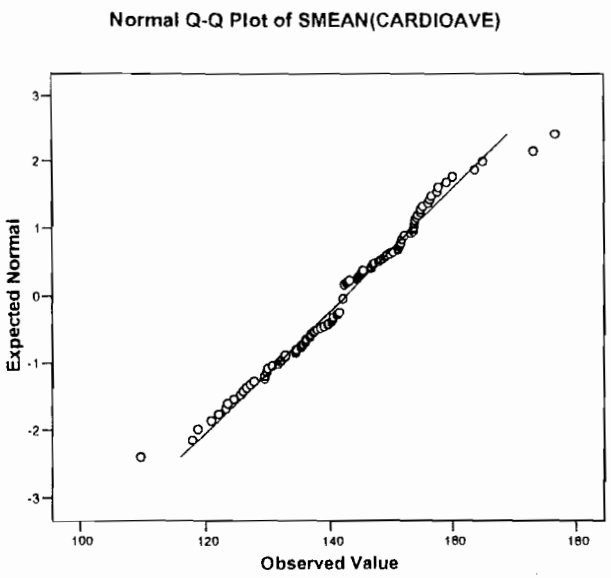
a. Lilliefors Significance Correction

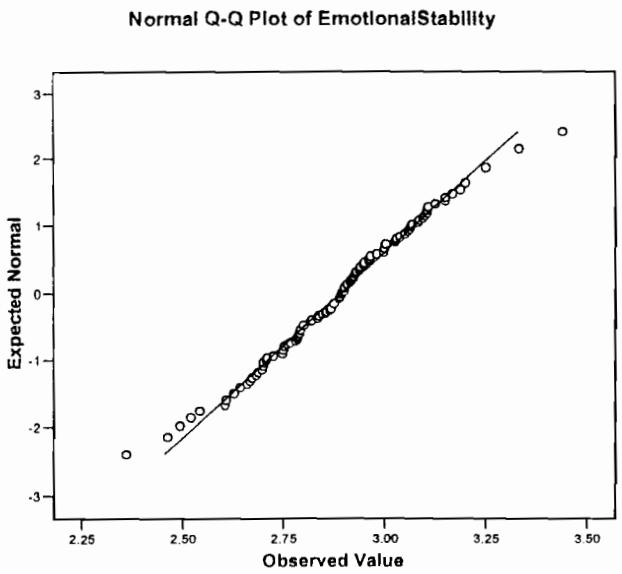
Normal Q-Q Plot of WEIGHTAVE

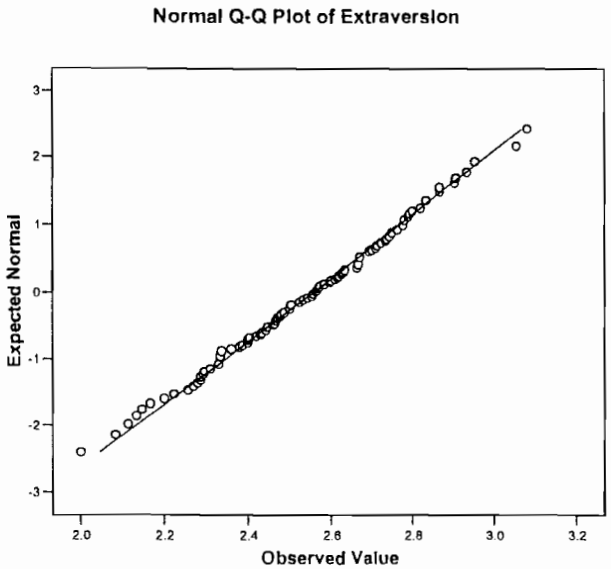


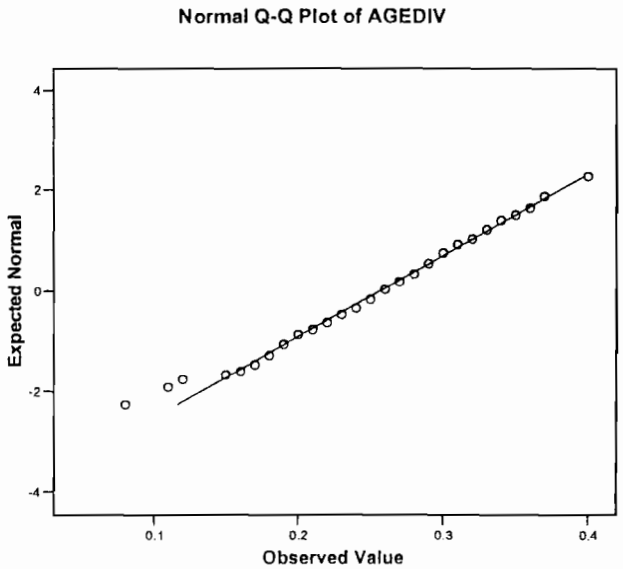
Normal Q-Q Plot of HEIGHTAVE



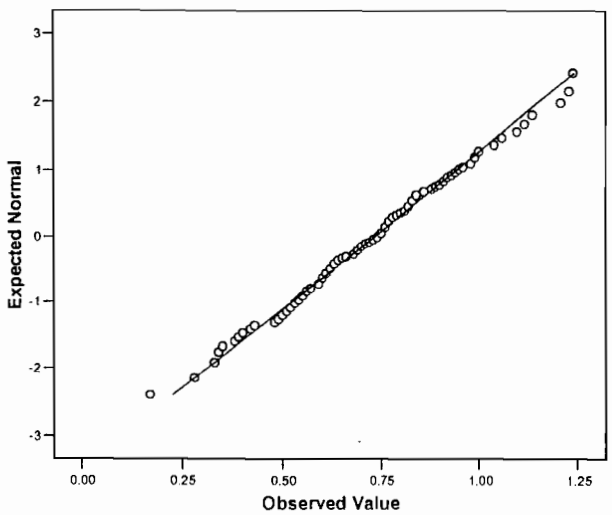

Normal Q-Q Plot of SMEAN(CARDIOAVE)
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
100
120
140
160
180


Normal Q-Q Plot of EmotionalStability
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
2.25
2.50
2.75
3.00
3.25
3.50

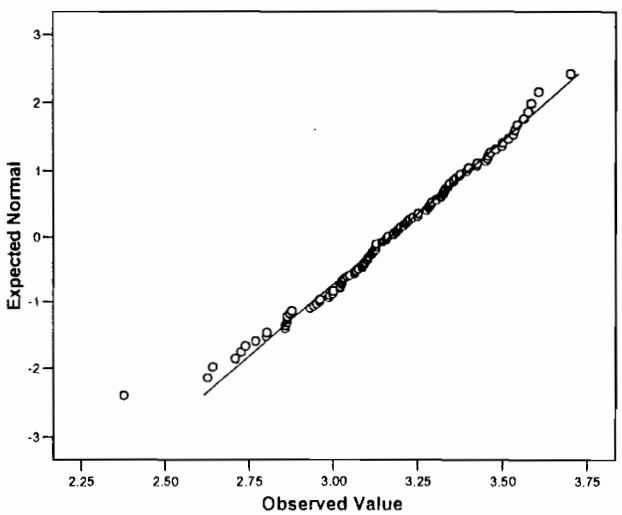

Normal Q-Q Plot of Extraversion
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
2.0
2.2
2.4
2.6
2.8
3.0
3.2

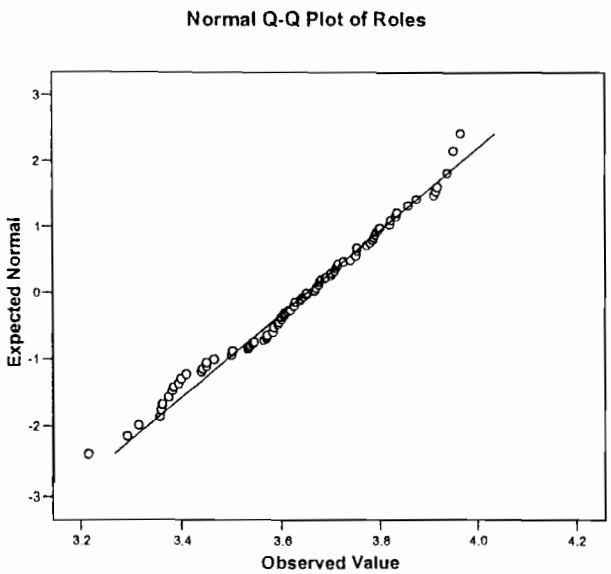

Normal Q-Q Plot of AGEDIV
Expected Normal
Observed Value
4
2
0
-2
-4
0.1
0.2
0.3
0.4

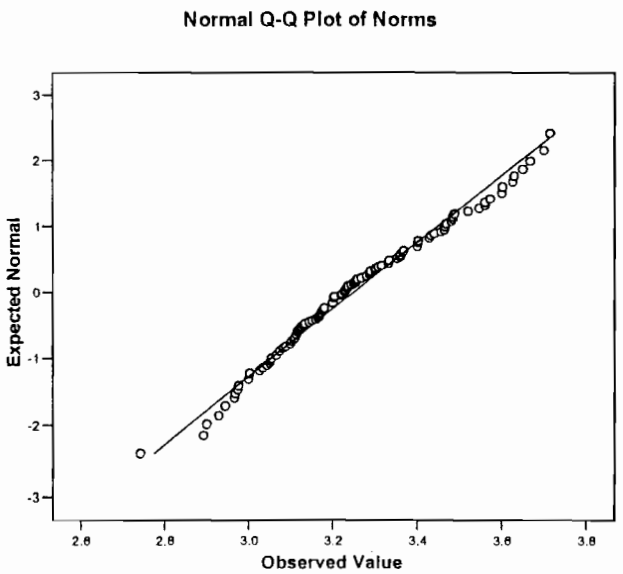
Normal Q-Q Plot of ORGTENDIV

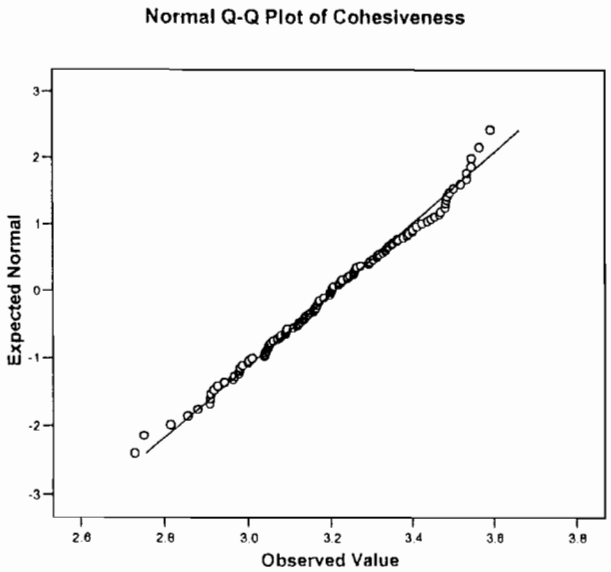


Normal Q-Q Plot of Leadership




Normal Q-Q Plot of Roles
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
3.2
3.4
3.6
3.8
4.0
4.2


Normal Q-Q Plot of Norms
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
2.6
2.8
3.0
3.2
3.4
3.6
3.8


Normal Q-Q Plot of Cohesiveness
Expected Normal
3
2
1
0
-1
-2
-3
2.6
2.8
3.0
3.2
3.4
3.6
3.8
Observed Value

Appendix 7 – Multiple Regression Evaluating the Main Effects of Team Member Resources and Team Structure on Initial Emergency Response Performance

Regression-Main Effects

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Norms, AGEDIV, WEIGHTAVE, CARDIO_1 SMEAN(CARDIOAVE), HEIGHTAVE, Emotional Stability, Extraversion, Roles, Leadership, ORGTENDIV[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: InitialEmergencyResponseTime Initial Emergency Response Time

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.684[a]	.468	.422	.59001	1.824

a. Predictors: (Constant), Norms, AGEDIV, WEIGHTAVE, CARDIO_1 SMEAN(CARDIOAVE), HEIGHTAVE, EmotionalStability, Extraversion, Roles, Leadership, ORGTENDIV

b. Dependent Variable: InitialEmergencyResponseTime Initial Emergency Response Time

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.281	10	3.528	10.135	.000[a]
	Residual	40.032	115	.348		
	Total	75.314	125			

a. Predictors: (Constant), Norms, AGEDIV, WEIGHTAVE, CARDIO_1 SMEAN(CARDIOAVE), HEIGHTAVE, EmotionalStability, Extraversion, Roles, Leadership, ORGTENDIV

b. Dependent Variable: InitialEmergencyResponseTime Initial Emergency Response Time

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	.928	4.644		.200
	WEIGHTAVE	-.047	.011	-.300	-4.227
	HEIGHTAVE	.043	.025	.124	1.694
	CARDIO_1 SMEAN(CARDIOAVE)	-.016	.005	-.232	-3.208
	EmotionalStability	-.147	.312	-.034	-.472
	Extraversion	1.644	.275	.449	5.987
	AGEDIV	3.416	1.361	.273	2.510
	ORGTENDIV	-1.060	.426	-.288	-2.489
	Leadership	1.124	.296	.333	3.801
	Roles	.783	.408	.161	1.920
	Norms	-2.722	.375	-.692	-7.254

Coefficients[a]

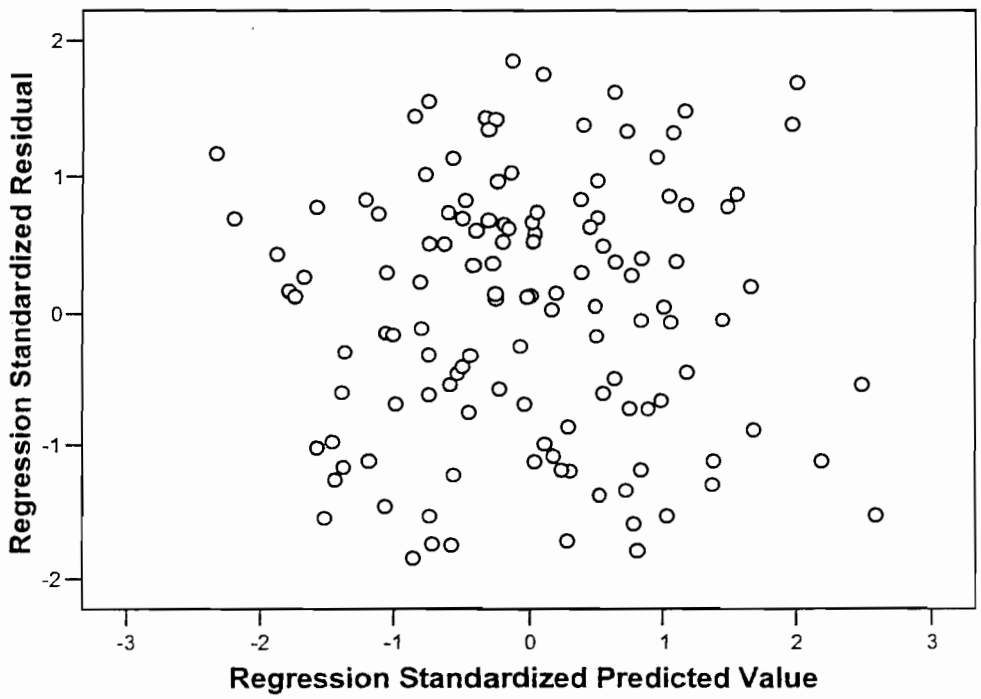
Model		Sig.	Collinearity Statistics	
			Tolerance	VIF
1	(Constant)	.842		
	WEIGHTAVE	.000	.915	1.092
	HEIGHTAVE	.093	.861	1.162
	CARDIO_1 SMEAN(CARDIOAVE)	.002	.883	1.133
	EmotionalStability	.638	.871	1.149
	Extraversion	.000	.820	1.219
	AGEDIV	.013	.390	2.565
	ORGTENDIV	.014	.346	2.891
	Leadership	.000	.603	1.657
	Roles	.057	.660	1.515
	Norms	.000	.508	1.967

a. Dependent Variable: InitialEmergencyResponseTime Initial Emergency Response Time

Charts

Scatterplot

Dependent Variable: Initial Emergency Response Time



Appendix 8 – Hierarchical Multiple Regression Evaluating the Interacting Effects of Cohesiveness with Team Structure Variables on Initial Emergency Response Performance

Regression-Interaction Effects

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Norms, AGEDIV, Roles, Leadership, ORGTENDIV[a]	.	Enter
2	Cohesiveness[a]	.	Enter
3	agexcohesive, tenxcohesive, leaderxcohesive, normsxcohesive, rolesxcohesive[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: CTimesecondspermeter1 Initial Emergency Response Time

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.389[a]	.152	.115	.67991
2	.393[b]	.154	.110	.68173
3	.483[c]	.233	.156	.66394

Model Summary[d]

Model	Change Statistics		
	R Square Change	F Change	df1
1	.152	4.147	5
2	.003	.378	1
3	.078	2.249	5

Model Summary[d]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	116	.002	
2	115	.540	
3	110	.054	1.684

a. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV

b. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV, Cohesiveness

c. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV, Cohesiveness, agexcohesive, tenxcohesive, leaderxcohesive, normsxcohesive, rolesxcohesive

d. Dependent Variable: CTimesecondspermeter1 Initial Emergency Response Time

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.585	5	1.917	4.147	.002[a]
	Residual	53.623	116	.462		
	Total	63.208	121			
2	Regression	9.761	6	1.627	3.500	.003[b]
	Residual	53.448	115	.465		
	Total	63.208	121			
3	Regression	14.718	11	1.338	3.035	.001[c]
	Residual	48.490	110	.441		
	Total	63.208	121			

a. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV

b. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV, Cohesiveness

c. Predictors: (Constant), Norms, AGEDIV, Roles, Leadership, ORGTENDIV, Cohesiveness, agexcohesive, tenxcohesive, leaderxcohesive, normsxcohesive, rolesxcohesive

d. Dependent Variable: CTimesecondspermeter1 Initial Emergency Response Time

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	5.538	1.484		3.733
	AGEDIV	2.919	1.529	.253	1.910
	ORGTENDIV	-.841	.454	-.247	-1.850
	Leadership	.661	.331	.213	1.996
	Roles	.448	.459	.100	.977
	Norms	-1.753	.407	-.483	-4.308
2	(Constant)	5.666	1.502		3.772
	AGEDIV	2.924	1.533	.254	1.907
	ORGTENDIV	-.854	.456	-.251	-1.873
	Leadership	.708	.341	.228	2.077
	Roles	.496	.466	.111	1.063
	Norms	-1.557	.518	-.429	-3.008
	Cohesiveness	-.335	.545	-.088	-.615
3	(Constant)	-5.522	29.274		-.189
	AGEDIV	-72.091	28.089	-6.254	-2.567
	ORGTENDIV	17.782	8.184	5.223	2.173
	Leadership	-5.115	5.644	-1.648	-.906
	Roles	7.948	7.778	1.775	1.022
	Norms	.669	6.248	.184	.107
	Cohesiveness	3.391	9.253	.887	.367
	agexcohesive	23.618	8.824	6.629	2.677
	tenxcohesive	-5.836	2.549	-5.500	-2.289
	leaderxcohesive	1.867	1.761	3.096	1.060
	rolesxcohesive	-2.393	2.465	-3.471	-.971
	normsxcohesive	-.752	1.923	-1.231	-.391

Coefficients[a]

Model		Sig.	Collinearity Statistics	
			Tolerance	VIF
1	(Constant)	.000		
	AGEDIV	.059	.416	2.404
	ORGTENDIV	.067	.411	2.436
	Leadership	.048	.642	1.558
	Roles	.330	.697	1.435
	Norms	.000	.582	1.718
2	(Constant)	.000		
	AGEDIV	.059	.416	2.404
	ORGTENDIV	.064	.410	2.442
	Leadership	.040	.610	1.638
	Roles	.290	.678	1.475
	Norms	.003	.362	2.765
	Cohesiveness	.540	.362	2.765
3	(Constant)	.851		
	AGEDIV	.012	.001	851.328
	ORGTENDIV	.032	.001	828.431
	Leadership	.367	.002	474.317
	Roles	.309	.002	432.663
	Norms	.915	.002	424.749
	Cohesiveness	.715	.001	839.539
	agexcohesive	.009	.001	879.493
	tenxcohesive	.024	.001	827.513
	leaderxcohesive	.291	.001	1222.422
	rolesxcohesive	.334	.001	1833.526
	normsxcohesive	.696	.001	1419.070

a. Dependent Variable: CTimesecondspermeter1 Initial Emergency Response Time

PENGHURAIAN SKOP TUGAS
PEGAWAI BOMBA GRED KB17

1. PERINGKAT ORGANISASI

Jabatan Bomba dan Penyelamat Malaysia

2. SKOP FUNGSI DAN TUGAS

2.1 Melaksanakan kerja-kerja operasi pemadaman dan penyelamatan seperti berikut:-

(a) Membuat persediaan tugas-tugas operasi pemadaman dan penyelamatan di balai;

(b) Menjalankan operasi pemadamanan kebakaran dan penyelamatan;

(b) Membuat penyiasatan kebakaran bagi setiap kebakaran;

(c) Membuat kajian kawasan dan pili bomba di kawasan jagaan balai;

(a) Membantu membuat pemeriksaan premis;

(b) Membuat pemeriksaan *(check list)* dan merekod setiap jentera serta peralatan kebombaan;

(c) Menjalankan latihan kemahiran dalam balai dan di bangunan di kawasan jagaan; dan

(d) Membantu menyediakan kontigensi pra kebakaran.

2.2 Melaksanakan kerja penyelenggaraan harian ke atas jentera bomba dengan cekap yang meliputi aspek-aspek berikut:-

(a) Melakukan kerja-kerja pemeriksaan harian ke atas jentera bomba selepas pertukaran pasukan bertugas berdasarkan jadual kerja harian;

(b) Membuat ujian perjalanan dan ujian keupayaan ke atas kereta bomba;

(c) Menentukan kebersihan jentera dan keselamatannya;

2.3 Mengendalikan pam bomba yang meliputi aspek-aspek berikut:-

(a) Menentukan ujian-ujian pam bomba dengan penjadualan dan peraturan jabatan;

(b) Menentukan segala prosedur pengendalian pam bomba semasa kerja-kerja pemadaman, kecemasan dan bencana dipatuhi; dan

(c) Melaporkan apa-apa kerosakan dan masalah pam dengan serta merta dan mengikut peraturan jabatan kepada ketua skuad keluaran/pegawai operasi pasukan/pegawai penjaga balai.

2.4 Melaksanakan tugas-tugas pemanduan jentera bomba dengan cekap yang meliputi aspek-aspek berikut:-

(a) Memandu jentera bomba ke tempat kejadian kebakaran, bencana dan apa-apa penyelamatan;

(b) Mengendalikan operasi jentera bomba seperti pam dan primer, apa-apa peralatan haidrolik yang lain-lain;

(c) Membuat catatan ke dalam rekod perjalanan jentera bomba mengikut arahan jabatan.

2.5 Melaksanakan kerja-kerja di Bilik Kawalan dan Pengawasan yang meliputi aspek-aspek berikut:-

(a) Mengendalikan dan pengujian alat-alat perhubungan telefon talian terus dan lain-lain peralatan telefon yang diletakkan di dalam bilik kawalan;

(b) Mencatat atau merekodkan dalam buku catatan harian bilik kawalan serta mengarahkan pasukan keluaran di balai-balai cawangan untuk menghadiri hal-hal kecemasan;

(c) Memberitahu kepada pegawai kanan bomba dan pegawai-pegawai di agensi-agensi mustahak seperti Pasukan Polis, Tenaga Nasional Bhd, Hospital, Bulan Sabit Merah, Jabatan Kebajikan Masyarakat, JBA dan lain-lain tentang hal-hal kecemasan;

(d) Mengendalikan alat-alat komunikasi di kereta bomba dan di balai-balai;

2.6 Lain-lain skop tugas yang ditentukan dari semasa ke semasa.

3. HUBUNGAN KERJA

3.1 Dalaman

(a) Rakan sekerja di pejabat/ bahagian/ unit/ balai; dan
(b) Pegawai dan kakitangan di dalam organisasi yang sama.

3.2 Luaran

(a) Orang awam;
(b) Para profesional;
(c) Tuan punya bangunan;
(d) Penghuni bangunan;

(e) Pengurusan bangunan;

(f) Jabatan/ agensi kerajaan; dan

(g) Syarikat swasta.

4. PERSEKITARAN KERJA

Dalam dan luar pejabat

5. LATIHAN YANG DIPERLUKAN

Pegawai Bomba boleh dikehendaki mengikuti latihan yang ditetapkan oleh ketua perkhidmatan yang berkenaan.

6. ANCAMAN

(a) Rasuah; dan

(b) Terdedah kepada bahaya semasa menjalankan tugas seperti api, terhidu asap/ gas.

FORMAT IKLAN

1. (a) Jawatan : Pegawai Bomba

   (b) Kementerian/Jabatan : Jabatan Bomba dan Penyelamat Malaysia

   (c) Kumpulan Perkhidmatan : Sokongan

   (d) Klasifikasi Perkhidmatan : Perkhidmatan Keselamatan dan Pertahanan Awam

2. Jadual Gaji — Jadual Gaji Matriks

Gred KB17	:	P1T1	RM662.35	-	P1T24	RM1741.67
		P2T1	RM704.70	-	P2T24	RM1838.47
		P3T1	RM748.26	-	P3T24	RM1938.90
Gred KB22	:	P1T1	RM1250.00	-	P1T15	RM2101.84
		P2T1	RM1363.74	-	P2T15	RM2351.10
Gred KB24	:	P1T1	RM1545.65	-	P1T13	RM2291.01
		P2T1	RM1659.39	-	P2T13	RM2530.59
Gred KB26	:	P1T1	RM1771.92	-	P1T9	RM2410.80
		P2T1	RM1942.53	-	P2T9	RM2639.49

3. Syarat Lantikan : Calon bagi lantikan hendaklah memiliki kelayakan seperti berikut:-

   (a) warganegara Malaysia;

   (b) berumur tidak kurang dari 18 tahun pada tarikh tutup iklan jawatan;

   (c) Sijil Pelajaran Malaysia atau kelayakan yang diiktiraf setaraf dengannya oleh kerajaan;

   (d) mempunyai syarat-syarat ukuran fizikal dan pancaindera seperti berikut:-

(i) tinggi sekurang-kurangnya 1.57m bagi lelaki dan 1.53m bagi wanita tanpa bersepatu;

(ii) berat badan sekurang-kurangnya 48kg bagi lelaki dan 46kg bagi wanita;

(iii) mempunyai ukuran dada yang biasa sekurang-kurangnya 81sm dan 86sm semasa menarik nafas (lelaki sahaja);

(iv) lulus ujian penglihatan bagi mata kiri dan kanan dengan ketetapan V/6/9 tanpa menggunakan cermin mata;

(v) pengecaman warna dan pendengaran yang tidak cacat; dan

(vi) diperiksa dan diperakui sihat untuk berkhidmat oleh pengamal perubatan berdaftar.

(e) Lulus ujian-ujian yang ditetapkan oleh ketua jabatan/ ketua perkhidmatan dari semasa ke semasa.

dan (f) Lulus Bahasa Malaysia/ Bahasa Melayu (termasuk lulus Ujian Lisan) pada peringkat Sijil Pelajaran Malaysia atau kelulusan yang diiktiraf setaraf dengannya oleh kerajaan.

4. Taraf Jawatan : Tetap.

5. Penaklukan Di Bawah Syarat-syarat Skim Perkhidmatan : Pegawai-pegawai yang memasuki perkhidmatan Pegawai Bomba adalah tertakluk kepada syarat-syarat skim perkhidmatan berkenaan yang berkuat kuasa serta pindaan-pindaan yang dibuat ke atasnya dari semasa ke semasa.

6. Fungsi Bidang Tugas : Melaksanakan tugas-tugas kebombaan.